St. Vital Transmission Complex

Environmental Assessment Report

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EXECUTIVE SUMMARY

Increasing demand for power in southern Manitoba has resulted in load growth on the Manitoba Hydro 230-kV system. Manitoba Hydro has designed the St. Vital Transmission Complex ("the Project") to provide system upgrades in southern Manitoba. This Project will serve existing and new load growth to provide firm transmission and adequate voltage support for the communities located in and around the region.

The Project consists of the construction of two 230-kV transmission lines that will both start at St. Vital Station (located in southeast Winnipeg). One line will run south to the Letellier Station, located outside of Letellier, Manitoba. The other line will run to the La Verendrye Station, located southwest of Winnipeg near the community of Oak Bluff. The St. Vital to La Verendrye line will be located on a right-of-way which exists south of Winnipeg known as the Southern Loop. The project also includes modifications at St. Vital, La Verandrye and Letellier Stations.

The St. Vital to La Verendrye transmission line would enable the 230-kV network in the Winnipeg area to withstand outages, improve transmission performance during normal operation and improve the reliability of the power system in southern Manitoba.

Load growth and wear and tear on the existing transmission infrastructure in southern Manitoba has also led to low voltage concerns. The St. Vital to Letellier transmission line will address current deficiencies in the system and provide a reliable source of electricity to southern Manitoba.

The proposed Project constitutes a Class 2 development as defined by the Classes of Development Regulation 164/88 under The (Manitoba) *Environment Act*. The Project will require an Environment Act Licence (EAL) prior to the initiation of any works. An EAL is the primary enabling permit for the Project. Class 2 developments are required to submit an Environment Act Proposal Form (EAPF) and Environmental Assessment Report (EA Report) to Manitoba Conservation and Water Stewardship to enable public and government agencies to examine the details of the proposed project, its anticipated effect on biophysical and socio-economic aspects of the environment, and measures that Manitoba Hydro intends to employ to mitigate potential effects. An EAL is issued upon the Minister's acceptance of the EAPF and EA Report.

This document outlines the environmental assessment for the Project and is designed to meet the requirements of the Act. The environmental assessment for the Project:

- Characterizes the biophysical and socioeconomic environments.
- Identifies potential effects on people and the environment.

- Determines ways to avoid or reduce potential adverse effects while enhancing beneficial effects.

Most of the land in the Project Siting Study Area (Map 1-1) consists of privately owned parcels which are utilized for agriculture. Annual crops grown include grains (wheat, winter wheat, barley, oats, corn and rye); legumes (soybeans, black beans, favabeans, field peas, and lentils); and oilseed crops (canola, flax, sunflower). Perennial crops grown include alfalfa and grasses. An appreciable proportion of the agricultural production in the Regional Assessment Area (RAA) relates to livestock production with multiple hog, dairy, beef and poultry operations found throughout the area. Approximately 20% of the area is rangeland, grassland or pasture, which are related to the livestock operations.

Government jurisdictions in the study area include the relevant local rural municipalities (RMs) and the City of Winnipeg. St. Malo Provincial Park is located within the study area; however, there are no Protected Areas or Resource Management Areas. The one First Nation reserve located within the study area, the Roseau River Anishinabe First Nation, consists of two parcels of land: the first is located at Ginew Manitoba and the second is located to the northeast of Green Ridge, Manitoba. The project lies within Métis Natural resource Harvesting Zones 33 and 35.

The St. Vital Station to Letellier Station transmission line employed a routing methodology based on the EPRI-GTC (Electrical Power Research Institute – Georgia Transmission Corporation) Overhead Electric Transmission Line Siting Methodology. This process incorporated input from internal and external stakeholders from engineering, natural, and socio-economic perspectives that was used to help develop a corridor for locating the transmission line.

Alternative routes were developed within this corridor and presented to the public for comment through Manitoba Hydro's public engagement process. Evaluation of route alternatives was accomplished using criteria developed by the project study team that was informed by stakeholder input. The resulting preferred route minimizes effects on people and the environment by balancing perspectives of the human, natural and technical perspectives.

As part of the EA process, numerous biophysical and socioeconomic components were evaluated as potential Valued Components (VC). The final VC list was determined by the multi-disciplinary project team undertaking the assessment based on: identified regulatory requirements; consultation with regulatory authorities; issues identified by stakeholders during the engagement process; prior experience with other similar projects; and professional judgment of Manitoba Hydro and EA team members. The following VCs are included in the effects assessment:

Physical VCs:

- Atmospheric Environment

- Groundwater Resources
- Aquatic Resources

Biophysical VCs:

- Natural Vegetation
- SOCC (Species of Conservation Concern) species
- Birds
- Mammals

Socio-economic VCs:

- Infrastructure and Services
- Employment, Business Opportunities and Economy
- Property and Residential Development
- Traditional Land and Resource Use
- Agricultural Land Use
- Non-Agricultural Land Use
- Communities (including Aesthetics, Public Safety and Human Health)
- Heritage Resources

The assessment of potential effects and mitigation measures led to the determination that the residual effects of the project are not significant on VCs.

Mitigation measures, monitoring and other follow-up actions identified in the effects assessment will be implemented through an Environmental Protection Program. Manitoba Hydro's Environmental Protection Program provides the framework for implementing, managing, monitoring and evaluating environmental and socio-economic protection measures consistent with regulatory requirements, corporate commitments, best practices and public expectations.

The cumulative effects assessment considered the predicted residual effects of the project that, due to spatial and temporal overlap, could act cumulatively with other projects in the area. Other projects considered included infrastructure projects related to highway improvements, and energy related projects such as other transmission line development and wind-energy projects. No significant cumulative effects were identified for any of the VCs.

1.0 INTRODUCTION

1.1 PROJECT OVERVIEW

Manitoba Hydro has identified the need to provide transmission improvements in order to improve voltage and supply to southern Manitoba. In order to meet these needs, Manitoba Hydro is proposing the development of the St. Vital Transmission Complex (‘the Project’; Map 1-1). This Project will serve existing and new load growth to provide firm transmission and adequate voltage support for the communities located in southern Manitoba.

The Project consists of:

- Construction and operation of two new 230-kiloVolt (kV) alternating current (AC) transmission lines. The transmission lines will originate from the 230-kV switchyard of the St. Vital Station located in the southeast of the City of Winnipeg, approximately 420 m from the intersection of Bishop Grandin and Lagimodiere boulevards.
  - The Letellier transmission line (119 km) will travel from the St. Vital Station, through south-central Manitoba (via the Steinbach area), and terminate at the Letellier Station at SE-19-2-2-E, near Letellier, Manitoba (Map 1-1).
  - The La Verendrye transmission line (37 km), will extend from the St. Vital Station and terminate at the La Verendrye Station located in SE-2-10-1-E, near Oak Bluff, Manitoba.
- Modifications at St. Vital, La Verendrye, and Letellier Stations including:
  - Major 230-kV equipment (breakers, switches etc.)
  - 230-kV steel support structures
  - 230-kV foundations

1.2 PURPOSE OF THE DOCUMENT

The Project requires a licence for a Class 2 Development under *The Environment Act* (Manitoba). The purpose of this document is to satisfy the licensing requirements of *The Environment Act* (Government of Manitoba 1987).

1.3 MANITOBA HYDRO'S TRANSMISSION SYSTEM

1.3.1 Mission, Vision and Goals

Manitoba Hydro, established in 1880, is a Crown Corporation located and headquartered in Winnipeg. Manitoba Hydro is the province's major energy utility and serves 542,000 electric customers throughout Manitoba and 267,000 natural gas customers in various communities throughout southern Manitoba. As one of the largest integrated electricity and natural gas distribution utilities in Canada, Manitoba Hydro employs more than 6,200 people, has assets approaching $13 billion and annual revenues of more than $2.4 billion (Manitoba Hydro 2013). Manitoba Hydro is administered by the Manitoba Hydro-electric Board appointed by the Lieutenant-Governor in Council. The Board reports to the Minister responsible for the *Manitoba Hydro Act* (1987) who, in turn, reports to the Manitoba Legislative Assembly.

Manitoba Hydro's mission is

"To provide for the continuance of a supply of energy to meet the needs of the province and to promote economy and efficiency in the development, generation, transmission, distribution, supply and end-use of energy" (Manitoba Hydro 2011a).

For over 60 years Manitoba Hydro's projects have primarily focused on the development of renewable hydroelectric power, and have played a major role in the development of the provincial economy and the Province as a whole.

Manitoba Hydro's Corporate Vision is:

"*To be the best utility in North America with respect to safety, rates, reliability, customer satisfaction, and environmental leadership; and to always be considerate of the needs of customers, employees, and stakeholders*" (Manitoba Hydro 2012a).

1.3.2 Environmental Policy and Management System

Manitoba Hydro respects the need to protect and preserve natural environments, social, economic and heritage resources affected by its projects and facilities and it does so through the following practices:

- Preventing or minimizing any adverse effects to the environment, and enhancing project benefits.
- Continually improving its Environmental Management System (EMS).
- Meeting or surpassing regulatory, contractual and voluntary requirements.
- Considering the interest and utilizing the knowledge of its customers, employees, communities, and stakeholders who may be affected by its actions.

- Reviewing its environmental objectives and targets annually to identify areas for improvement in its environmental performance.

- Documenting and reporting its activities and environmental performance (Manitoba Hydro 2012b).

Manitoba Hydro has developed and implemented an EMS and has registered the system to the International Organization for Standardization (ISO) 14001 EMS standard. The Manitoba Hydro EMS enables the identification of environmental effects, setting of goals to manage effects, implementation of plans to meet the goals, and evaluation of performance. The EMS enables Manitoba Hydro to make continual improvements to its EMS and its environmental performance. As a member of the Canadian Electrical Association, Manitoba Hydro participates in the Sustainable Electricity Program. Under this program every member utility must implement an EMS consistent with ISO standards.

1.4 REGULATORY FRAMEWORK

1.4.1 Federal-Provincial Coordination

The Canada-Manitoba Agreement on Environmental Assessment Cooperation provides a mechanism to address both provincial and federal requirements with a single environmental assessment, administered by both governments with the primary point of contact being the provincial environmental assessment agency, Manitoba Conservation and Water Stewardship (MCWS) (Canada–Manitoba Agreement on Environmental Assessment Cooperation 2007).

1.4.2 Provincial Environmental Assessment and Permitting

At a voltage capacity of 230 kV, the Project meets the requirements of a Class 2 Development as defined by the *Classes of Development Regulation 164/88* under *The Environment Act* (Government of Manitoba1987). The Project will therefore require an Environment Act Licence (EAL) prior to the initiation of any works. An EAL is the primary enabling permit for the Project. Class II developments are required to submit an Environment Act Proposal Form (EAPF) and Environmental Assessment Report (EA Report) to MCWS to enable public and government agencies to examine the details of the Project, its anticipated impact on biophysical and socio-economic aspects of the environment, and measures that Manitoba Hydro intends to use to mitigate potential impacts. Under the provincial EA process, only the Project component requiring a permit should be included in the EA report. An EAL is issued upon the Director’s acceptance of the EAPF and the EA Report.

The coordination of approvals begins with the establishment of an interdepartmental review panel called the Technical Advisory Committee (TAC), which is led by MCWS, Environmental Approvals Branch, and consists of provincial and federal government representatives with the technical expertise necessary to assess the potential effects of a project. Following submission of the EAPF and EA Report, a technical and public review is conducted where the submissions are made available for public review through the public registry system of MCWS. At the end of the public review and comment period, the Director of Environmental Approvals Branch will assess the level of public concern. If the Director determines there is significant public concern, the Director will recommend to the Minister that the Clean Environment Commission hold a public hearing. The Commission makes recommendations to the Minister based on the findings of the hearing. Based on these results, the Minister will either issue or refuse a Licence. Issuance of the *Environment Act* Licence, and the terms and conditions it may contain, will be based on this submission and public input.

This document describes the process used to identify alternate routes for both transmission lines and the environmental assessment of the final preferred route. This EA Report is being submitted to MCWS as the Manitoba Hydro application for environmental licensing of the project under *The Environment Act*.

1.4.3 Federal Environmental Assessment and Permitting

The Federal Environmental Assessment process is coordinated by the Canadian Environmental Assessment Agency (CEA Agency) under the *Canadian Environmental Assessment Act 2012* (CEAA 2012). CEAA 2012 establishes a federal environmental assessment process in order to achieve sustainable development by promoting economic development that conserves and enhances environmental quality. CEAA 2012 requires an assessment of the environmental effects of a project if the project is included on the Designated Projects List or if federal authorities have to make a decision regarding some aspect of the project. A federal environmental assessment may be triggered pursuant to the provisions of Section 5 of the Act.

Under CEAA 2012, a 230-kV transmission line is not a physical activity under the Regulations Amending the Regulations Designating Physical Activities (Government of Canada 2013). However, if a federal authority has to exercise a power or perform a duty or function conferred on it under any Act of Parliament other than CEAA 2012, environmental effects must be taken into account (CEAA 2012 Sec. 5 (2)).

The Project will require notice pursuant to Section 2 of the *Navigation Protection Act*, because the transmission lines cross over the Red River which is a “Scheduled Water” under the Act. The Project crosses the river at two locations: near the south city limit of Winnipeg and southeast of Letellier. If the Minister determines that the Project will substantially interfere with navigation pursuant to Section 5 of the Act, an approval will be required. It is anticipated that the two crossings would be reviewed as a single work.

1.5 OUTLINE OF THE ENVIRONMENTAL ASSESSMENT REPORT

This EA Report includes an examination and consideration of the potential effects that may result from the Project to:

- Physical Environment – Atmosphere (air, climate and climate change), land (terrain, geology, soils), and water (surface, groundwater, water quality).
- Biological Environment – Aquatic biota and habitat, terrestrial ecosystems and vegetation, terrestrial species and habitat (mammals, birds, amphibians, reptiles, invertebrates).
- Land and Resource Use – Commercial resource use (forestry, mining, agriculture, fishing), protected areas, Aboriginal land and resource use, recreation and tourism (including aesthetics), property ownership, infrastructure services and facilities.
- Socio-economic and Cultural Conditions – Population and demographics, economic base, personal, family and community life (including human health and well-being, employment and income), local community, traditional rights and heritage and cultural resources.

This EA Report is organized as follows:

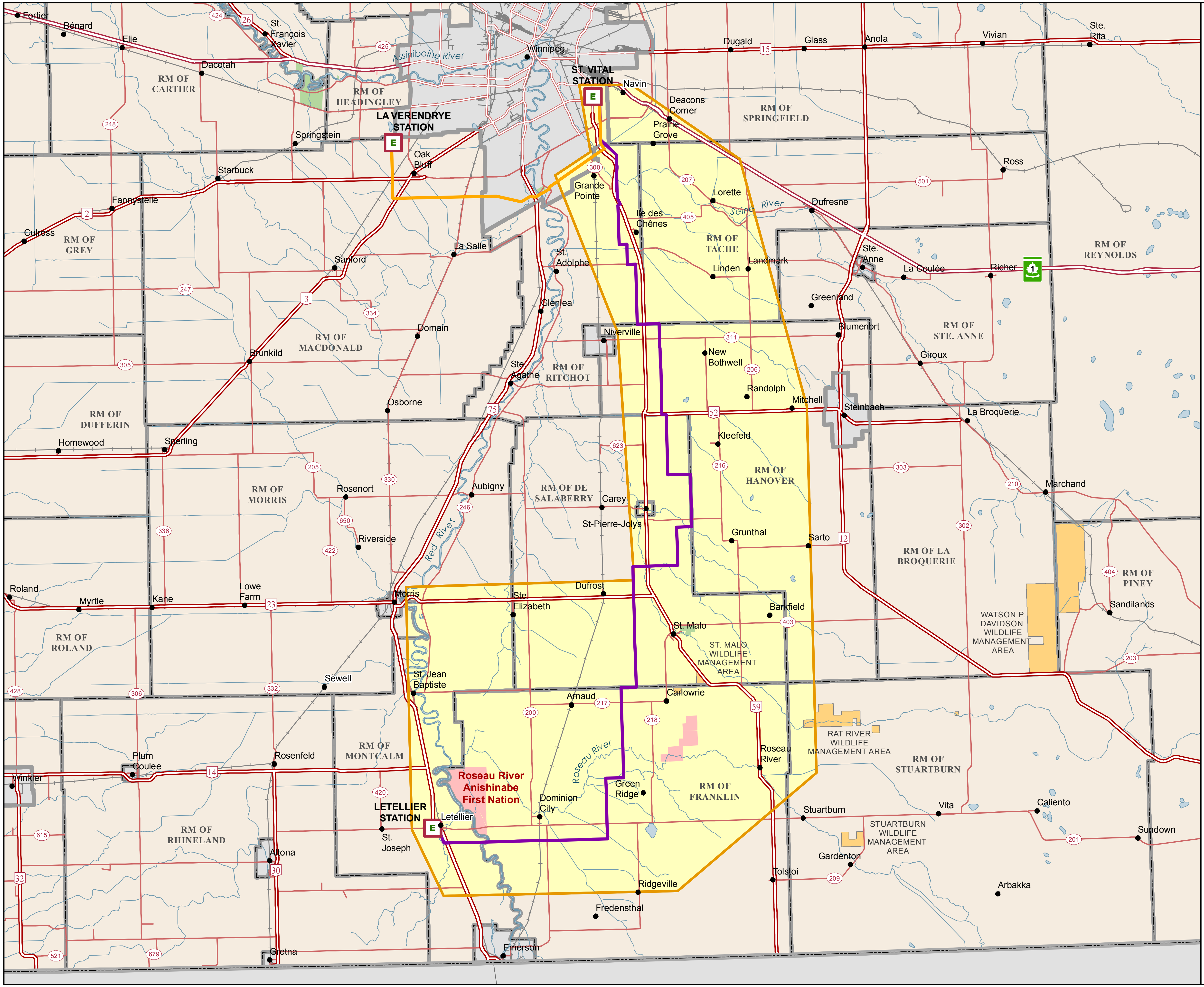
- **Chapter 2.0, Need and Alternatives** explains the need for the Project, why it was preferred to alternatives, and alternate means of Project construction and operation.
- **Chapter 3.0, Project Description** provides a detailed description of the Project and its components.
- **Chapter 4.0, Environmental Assessment Process** describes the approach and methods used for the Environmental Assessment.
- **Chapter 5.0, Valued Component Selection and Project-Environment Interaction** describes how Valued Components were selected and identifies potential interactions between the environment and Project activities.
- **Chapter 6.0, Existing Environment** describes the existing biophysical and socio-economic environment in the Project area. This chapter provides the baseline environmental conditions for the Project Siting Study Area.

- **Chapter 7.0, Pubic Engagement Program** provides the purpose and objectives of the Public Engagement Program (PEP), the process used for public engagement including the types and formats of venues. This chapter also discusses the public engagement results.

- **Chapter 8.0, Identification and Evaluation of Alternative Routes** provides the approach for selecting the transmission line route as well as a comparison of the route alternatives. A description of the Preferred Route is also provided.

- **Chapter 9.0, Effects Assessment and Mitigation** identifies and evaluates the environmental effects of the Project. It identifies the mechanisms for causing effects, provides mitigation measures for the effects, describes the residual effects as well as cumulative effects and assesses the significance of the effects.

- **Chapter 10.0, Environmental Follow-up and Monitoring** describes the environmental protection, monitoring and follow-up activities.



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

E	Electrical Station
━	Final Preferred Route (V95L)
━	La Verendrye - St. Vital (Y36V) Transmission Line
▭	Project Siting Study Area

Landbase

●	Community
1	Trans Canada
20	Provincial Highway
━	Provincial Road
┼	Railway
▭	City / Town
▭	Rural Municipality
🟥	First Nation
🟩	Provincial Park
🟧	Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 21, 2014

N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Project Siting Study Area

Map 1-1

2.0 NEED FOR AND ALTERNATIVES TO THE PROJECT

As a Crown Corporation, Manitoba Hydro is under statutory obligation to provide an adequate supply of power to meet the needs of the Province. Without improvements to the southern Manitoba transmission and distribution network, the system would reach capacity which would result in limited power availability that could potentially limit economic activities.

2.1 NEED FOR THE PROJECT

Increasing demand for power in southern Manitoba has led to load growth on the Manitoba Hydro 230-kV system. The St. Vital to La Verendrye transmission line would enable the 230-kV network in the Winnipeg area to withstand outages (some of them severe), improve its performance during normal operation and improve the reliability of the power system in southern Manitoba (Manitoba Hydro 2013). Furthermore, this transmission line will overcome existing limitations by upgrading the 230-kV network to a 230-kV ring, which will eliminate station isolation and reduce the likelihood of outages and blackouts.

Load growth and degradation of the existing transmission infrastructure in southern Manitoba has also led to low voltage concerns (Manitoba Hydro 2013). The St. Vital to Letellier transmission line will address these concerns and provide a reliable source of power to southern Manitoba.

2.2 ALTERNATIVES TO THE PROJECT

Alternatives to the Project may be defined as different means through which to meet the aims and purpose of the Project. In this instance, there are no alternatives to the Project. The need for the Project is one of capacity in southern Manitoba and not of alternative sources of power. Furthermore, such alternate sources of power, be they local or imported, renewable or finite, would require similar improvements to the transmission network in order to facilitate the distribution of power.

2.3 ALTERNATIVE MEANS OF CARRYING OUT THE PROJECT

"Alternative means" are the various technically and economically feasible ways the Project can be implemented or carried out (CEAA 2007).

The alternative to development of the St. Vital to La Verendrye transmission line that was considered was to construct a new 230-kV overhead line on the southern side of Winnipeg from La Verendrye Station to Riel Station. Riel Station is located on the east side of Winnipeg, south of Provincial Trunk Highway (PTH) 15. This alternative was not recommended because it was higher cost and did not provide the same degree of improvement to network operating conditions and overall functionality in the 230-kV system (Manitoba Hydro 2008a).

The alternatives to the development of the St. Vital to Letellier transmission Line are described below. Stations and transmission lines listed below are shown on Map 2-1.

These options were not selected as the preferred alternative offered a lower cost and better functionality for other future system upgrades.

Option 2: Construct a new 230-kV overhead line from Letellier Station to Riel Station. Note: the in-service date (ISD) of the new line in Option 2 is two years later than that in Option 1 since Riel Station will not be in service until October 2014.

This option was not recommended (Manitoba Hydro 2008b).

Option 3:

a) Construct a new 230-kV overhead line from Letellier Station to Richer South Station. Richer South Station is located approximately 3 km south of Richer, Manitoba.
b) Upgrade the capacity of the 230-kV line R49R. Note: the installation of the new 230-kV line between Letellier and Richer South would overload line R49R under some operating conditions between 2008 and 2023. In addition, the new line would not improve low-voltage conditions at Letellier, Stanley and St. Leon stations.

This option was not recommended.

Option 4: Rebuild 230-kV lines Y51L and S60L with larger conductor. Note: the existing conductor on 230-kV lines Y51L and S60L would not be able to give the required line ampacity which is needed under some operating conditions between 2008 and 2023. In order to achieve such line ampacity, larger conductors are required for these lines. As a result, reconducting lines Y51L and S60L is not preferred.

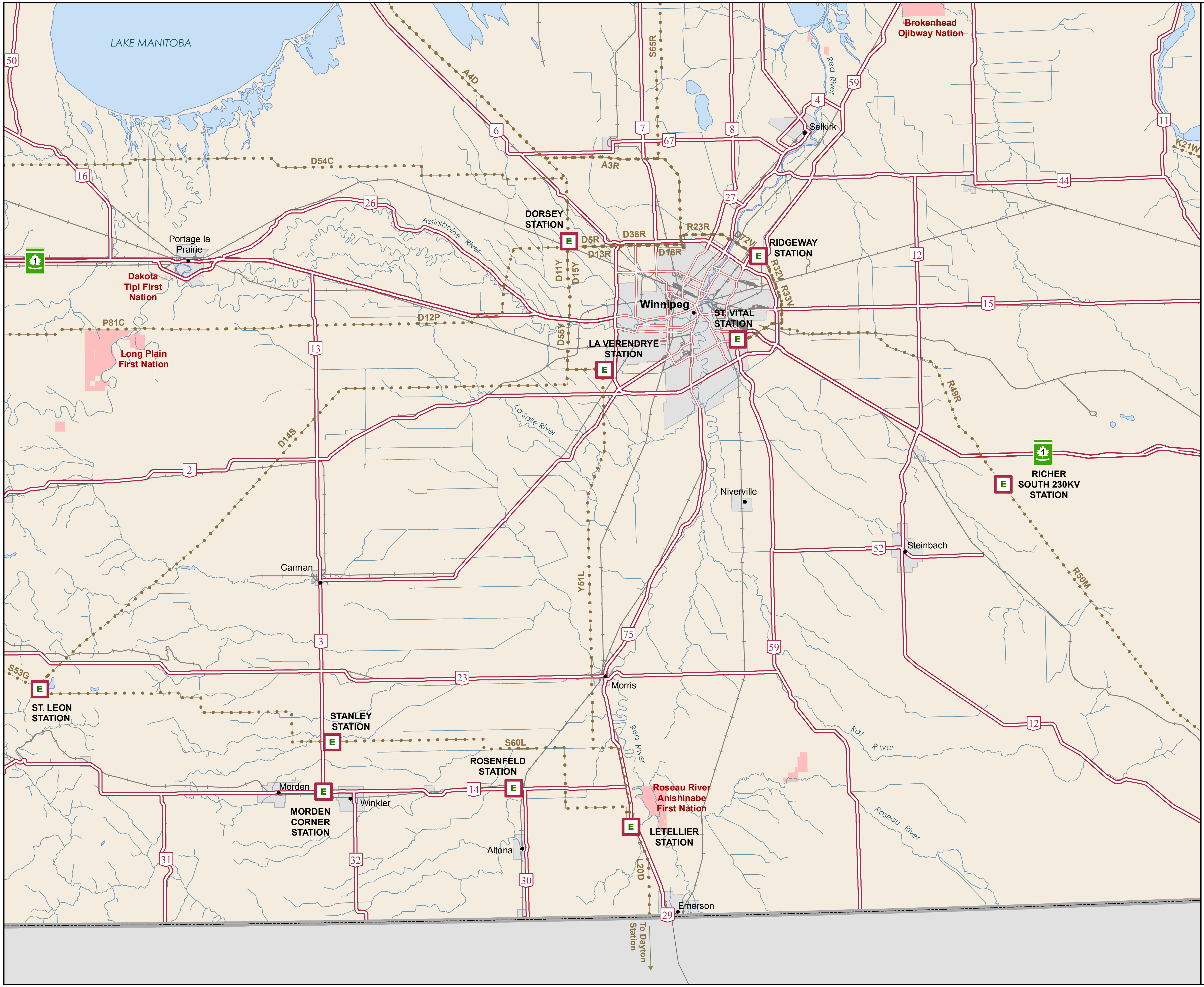
This option was not recommended (Manitoba Hydro 2008b).

2.4 CONCLUSION

Manitoba Hydro conducted two separate studies in 2008 to:

- Enhance the reliability of the 230-kV network in the Winnipeg area (Manitoba Hydro 2008a). This study concluded that the development of the St. Vital Station to La Verendrye Station transmission line was the preferred option.
- Address contingency loadings and low-voltage concerns in the south-central area of Manitoba due to growth in the area and to maintain export levels at these increased load

levels (Manitoba Hydro 2008a). This study concluded that development of the St. Vital Station to La Verendrye Station transmission line was the preferred option.



Manitoba Hydro

St. Vital Transmission Complex

Infrastructure

- E Electrical Station
- ∙∙∙∙ Transmission Line (230 kV)

Landbase

- ● Community
- Trans Canada
- Provincial Highway
- Railway
- ▨ City / Town
- 🟥 First Nation

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 21, 2014

N

0 10 20 Kilometres
0 5 10 Miles

1:600,000

Manitoba Hydro
South Central Manitoba
230 kV Network

Map 2-1

3.0 PROJECT DESCRIPTION

3.1 INTRODUCTION

The proposed St. Vital Transmission Complex Project is made up of two separate but related components; the La Verendrye Station to St. Vital Station (Y36V) and St. Vital Station to Letellier Station (V95L) 230-kV transmission lines (Map 3-1).

The technical details for lines V95L and Y36V, described in the sections below, are based on preliminary designs, standard design criteria, and construction policies and practices. Final engineering design will be completed upon receipt of *The Environment Act* Licence. Final design will incorporate any conditions included in the Licence.

3.2 ST. VITAL-LETELLIER (V95L) PROJECT COMPONENTS

The St. Vital Station to Letellier Station V95L 230kV Transmission Line includes the construction of 119 km of 230-kV transmission line as well as additions to St. Vital and Letellier stations for V95L termination.

3.2.1 Transmission Line

3.2.1.1 Design Considerations

The transmission line design and construction will meet or exceed the design standards as set out by the Canadian Standards Association (CSA 2010) as well as the planning, performance, and reliability standards of the North American Electric Reliability Corporation (NERC).

3.2.1.2 Transmission Line Routing

The Final Preferred Route for V95L is shown on Map 3-1. Manitoba Hydro used the Electrical Power Research Institute – Georgia Transmission Corporation (EPRI-GTC) Overhead Electric Transmission Line Siting Methodology (Georgia Transmission Corporation 2006) to determine the final preferred route for V95L. Details of the routing process are provided in Chapter 8.

3.2.1.3 Right-of-Way Requirements and Acquisition Policy

Manitoba Hydro obtains the legal right to construct, operate, and maintain their transmission lines. This right is obtained through easement of privately owned lands, or by Crown Land Reservation for right of use on Provincial Crown Land.

Right-of-way (ROW) width is determined by a variety of factors. The width of the ROW is based on the requirement for safe conductor swing or blowout. Factors affecting ROW width include tower type and height, conductor and land use.

Figures 3.2-1 and 3.2-2 show two ROW configurations for different segments of the line as shown on Map 3-1. The ROW will change depending on whether it is along a ¼ section line (Figure 3.2-1), adjacent to a road (Figure 3.2-2) or through an open field or adjacent to an existing transmission line. A section through Sage Creek will be double circuited (Figure 3.2-3). Specialized double circuit towers will be used to hold both V95L and Y36V.

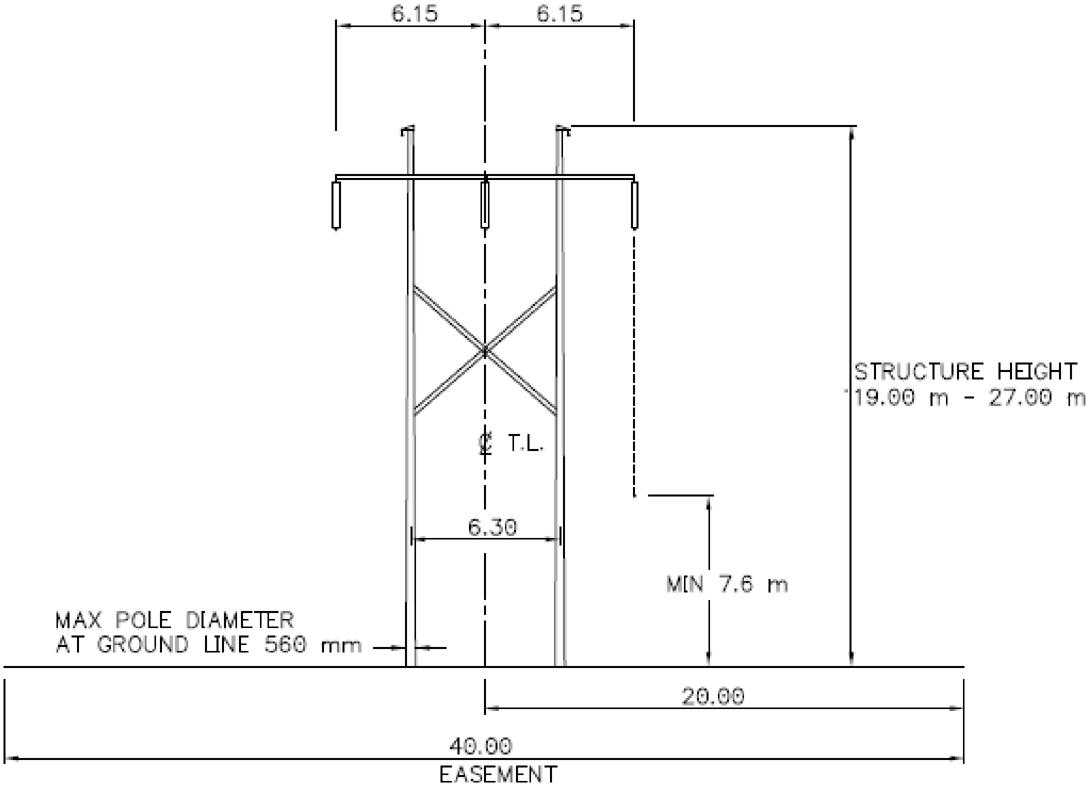


Figure 3.2-1: **V95L Cross Section along Quarter-Section Line (Cross-Section A-A, Figure 3.2-3)**

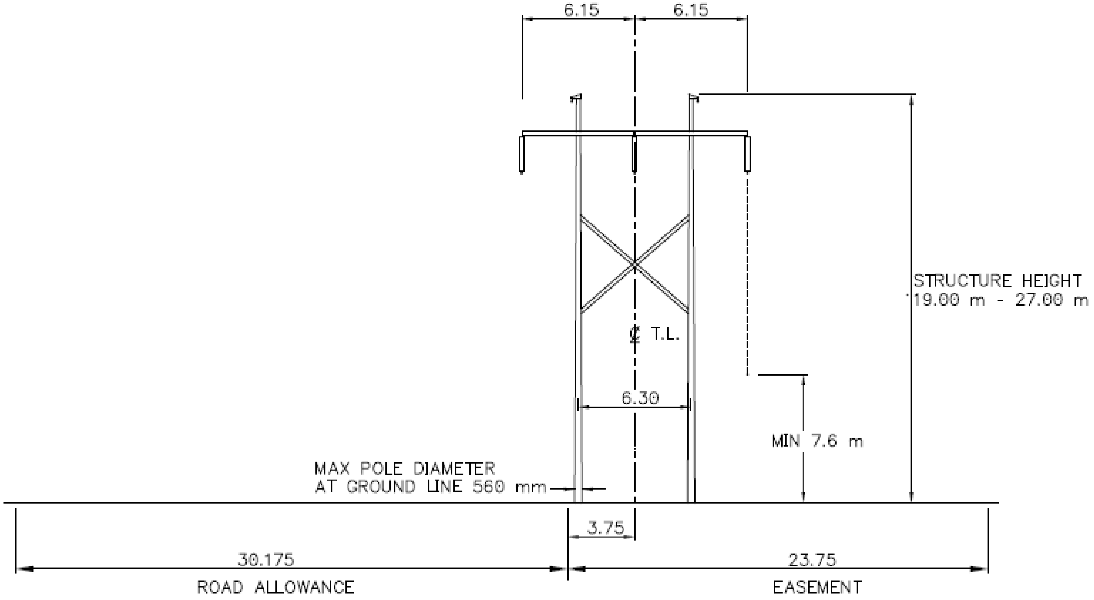


Figure 3.2-2: V95L Cross Section along Road Allowance (Cross-Section B-B, Figure 3.2-3)

3.2.1.4 Structures

Typical suspension towers will be tubular steel H-Frame, 19-27 m high and 6-9 m wide at the base (Figures 3.2-1, 3.2-2). The span between the towers will be approximately 250 m. If tower extensions are necessary at stream and transportation crossings, the tower heights and footprints will increase.

Specialized heavy-angle and dead-end structures will be required for line redirection and to terminate the transmission line at each of the stations. Typical heavy-angle and dead-end structures will be tubular steel, H-Frame (Figure 3.2-4).

Specialized double circuit towers will be used for the section through Sage Creek (Figure 3.2-3). These towers will hold the circuits for both V95L and Y36V. Double circuit dead end towers will be required at the start and end of the double circuit section (Figure 3.2-3).

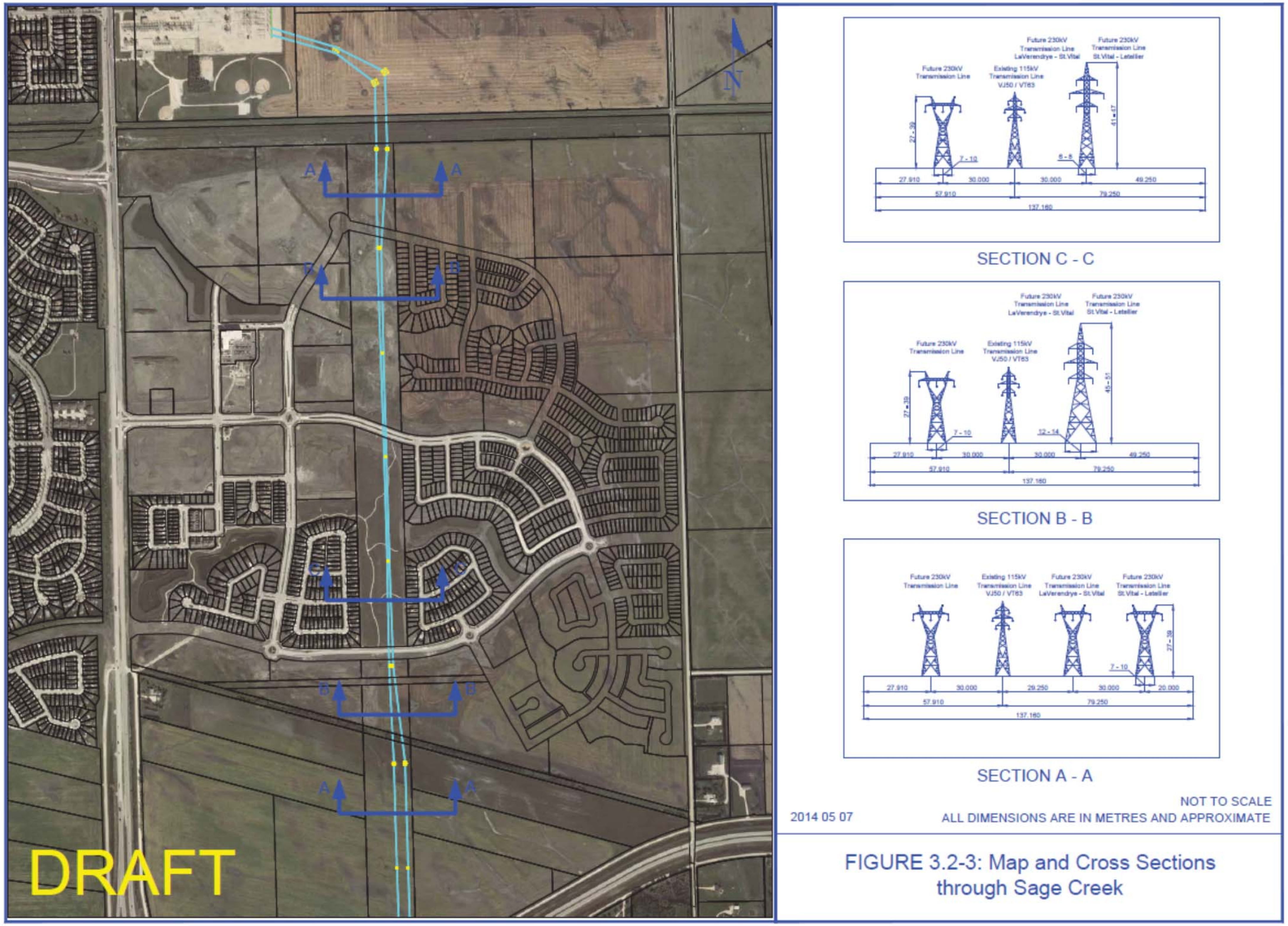


Figure 3.2-3: Map and Cross Sections through Sage Creek

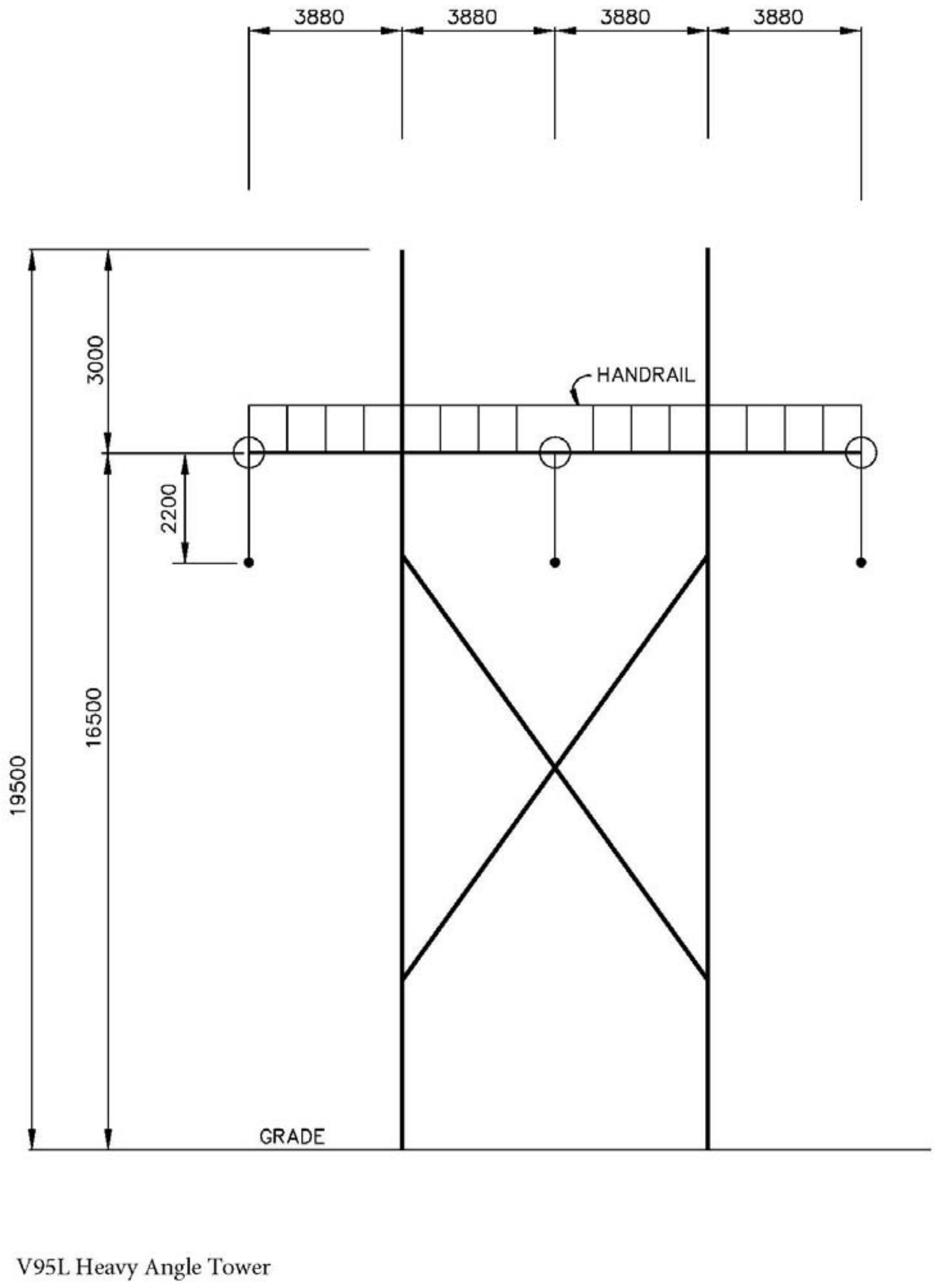


Figure 3.2-4: **V95L Heavy Angle Tower**

3.2.1.5 Conductors and Insulators

Line V95L is a single-circuit line configuration consisting of three 1272 MCM ACSR (Aluminum Conductors, Steel Reinforced) conductors. Each conductor consists of aluminum strands wrapped around a centre core of steel strands and will be suspended from each structure by insulator strings. The ground clearance will meet or exceed the requirements of Overhead Systems, C22.3 Standard No. 1-10 (CSA 2010). The minimum ground-to-conductor clearances for 230-kV power lines are:

- Farmland: 6.1 m
- Road and Highways Crossings: 6.325 m
- Railways: 9.3 m
- Underground Pipelines: 6.1 m
- Pedestrian only: 4.6 m
- Watercourse – Class 0: 6.1 m
- Watercourse – Class 1: 7.3 m
- Watercourse – Class 2: 9.3 m
- Watercourse – Class 4: 13.3 m

3.2.1.6 Ground Wire

Two ground wires (skywires) will be strung parallel to the transmission line and along the tower apices to provide grounding and lightning protection. One of these wires in the future may be converted to an Optical Ground Wire (OPGW) that will provide communications during the transmission line operation. The ground conductor will be constructed of galvanized steel strands and have an outside diameter of approximately 9 mm. OPGW wires for this type of transmission line are typically 12 mm in diameter.

3.2.2 Station Modifications

Station modifications will be required to terminate line V95L at St. Vital and Letellier stations. All station modifications and equipment additions will be conducted on existing Manitoba Hydro property and within the fenced area of each station.

3.2.2.1 St. Vital and Letellier Stations

Upgrades at both stations include additional equipment to terminate the new lines (detailed below) as well as revisions to the protection and communication systems.

The equipment below will be installed in breaker position R10 (Figure 3.2-5) at St. Vital Station and breaker position R4 (Figure 3.2-6) at Letellier Station.

1) Major 230-kV equipment installed at each station:
    - One 3-Phase 230-kV breaker
    - Three 1-Phase 230-kV current transformers for breaker protection
    - Two 3-phase 230-kV centre-break switches
    - One 3-Phase 230-kV motor-operated centre-break switch with ground disconnect
    - Three 1-phase 230-kV potential transformers for line protection
2) 230-kV steel structures installed at each station:
    - One 3-phase supports for current transformers
    - One 1-phase potential transformer support
    - Three 3-phase centre-break disconnect switch supports
    - One 1-phase low-bus support
3) 230-kV foundations installed at each station:
    - One circuit-breaker foundation
    - One master control cabinet foundation
    - One current transformer support foundation
    - Three disconnect switch structure foundations
    - One voltage transformer support foundation
    - One 1-phase low-bus support foundation

Line V95L will egress from St. Vital Station from the east side, head east for a short distance then head south through Sage Creek.

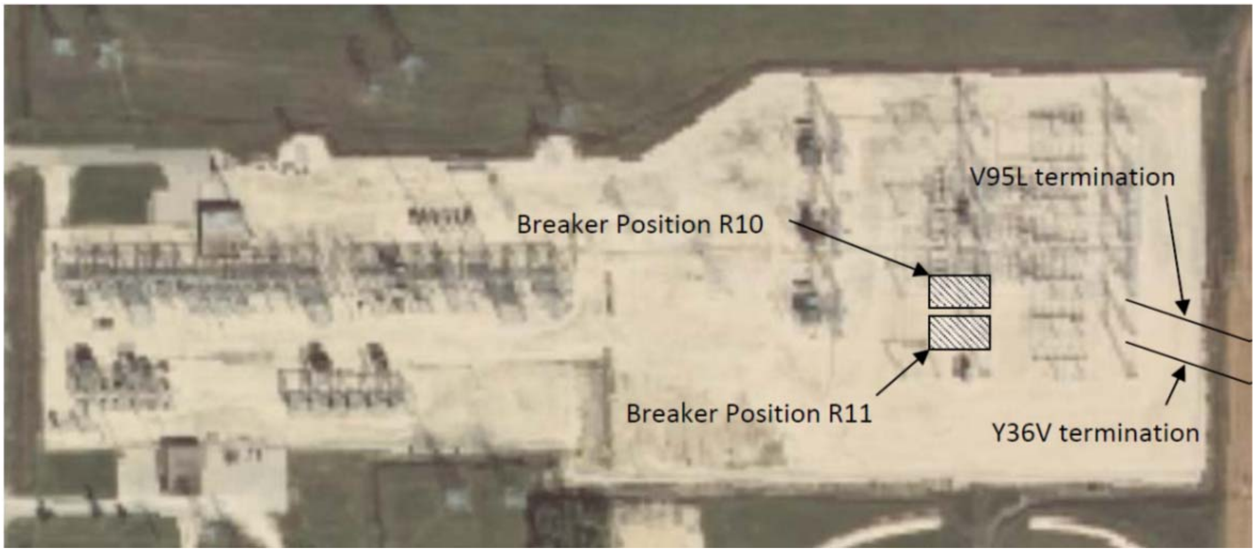


Figure 3.2-5: St. Vital Station Modifications

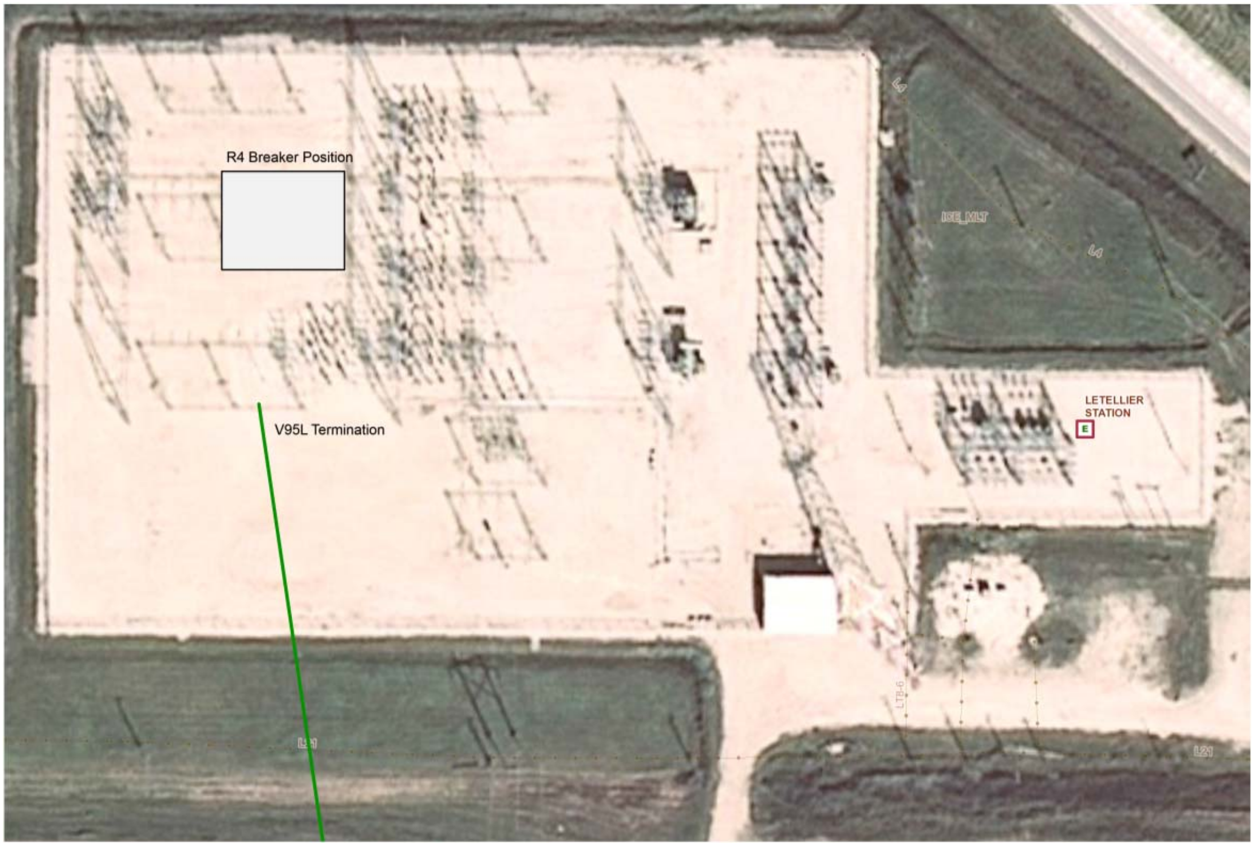


Figure 3.2-6: Letellier Station Modifications

3.3 LA VERENDRYE-ST. VITAL (Y36V) PROJECT COMPONENTS

The La Verendrye Station to St. Vital Station Y36V 230-kV Transmission Line includes the construction of 37 km of 230-kV transmission line as well as upgrades to St. Vital and La Verendrye Stations for Y36V termination.

3.3.1 Transmission Line

3.3.1.1 Design Considerations

The transmission line design and construction will meet or exceed the design standards as set out in the Canadian Standards Association (CSA 2010) as well as the planning, performance, and reliability standards of the North American Electric Reliability Corporation (NERC).

3.3.1.2 Transmission Line Routing

The Final Preferred Route for line Y36V is shown on Map 3-1. Line Y36V will follow the Southern Loop. The Southern Loop is a dedicated transmission corridor that will accommodate multiple transmission lines necessary for system reliability and to meet future energy demands in southern Manitoba.

3.3.1.3 Right-of-Way Requirements and Acquisition Policy

Manitoba Hydro has been acquiring property rights for the Southern Loop for many years to locate multiple transmission lines on a single corridor to reduce the number of independent rights-of way on the landscape.

Right-of-way width is determined by a variety of factors. The width of the ROW is based on the requirement for safe conductor swing or blow-out. Factors affecting ROW width include tower type and height, conductor and land use.

Figure 3.2-3 shows the proposed ROW through Sage Creek. Figure 3.3-1 shows the proposed ROW configuration through the Southern Loop corridor.

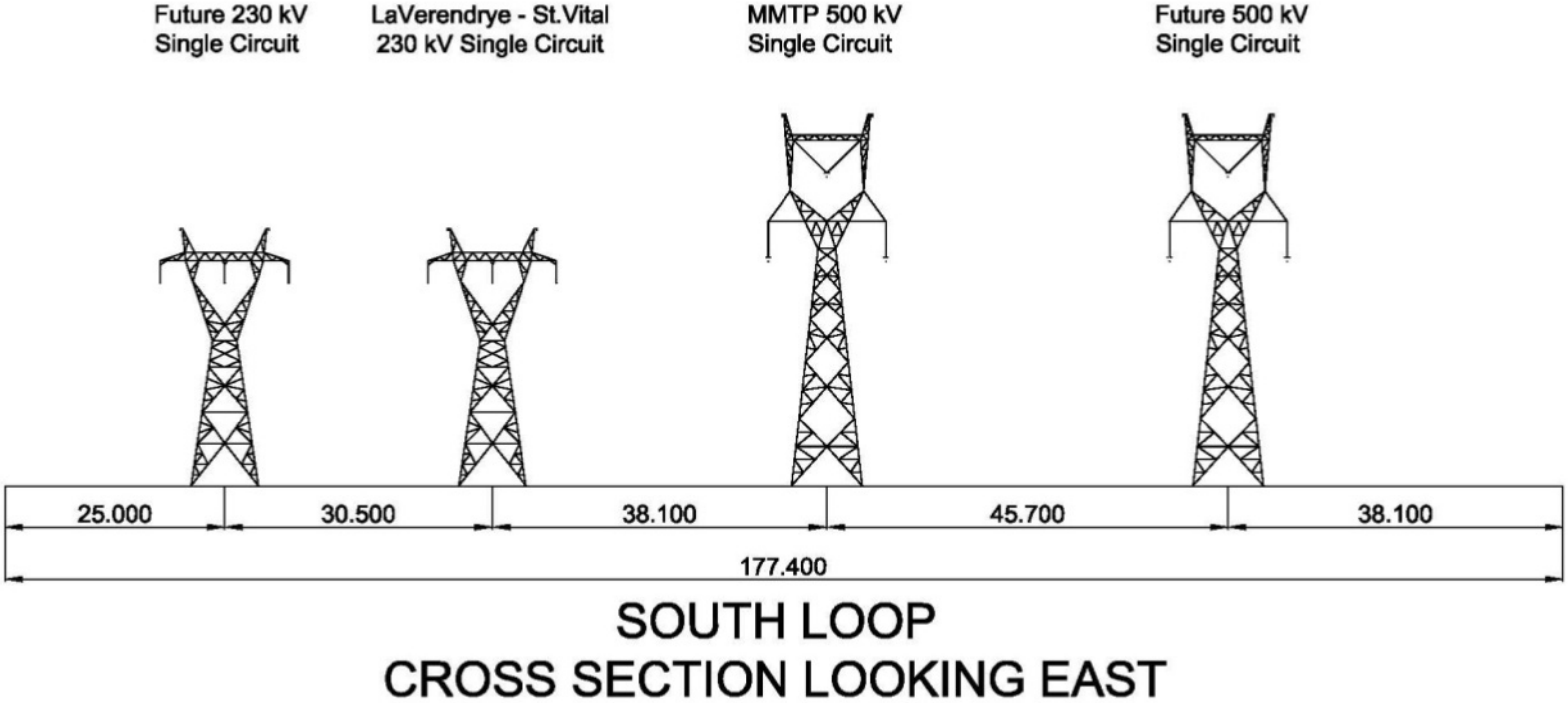


Figure 3.3-1: **Y36V Cross Section through the Southern Loop**

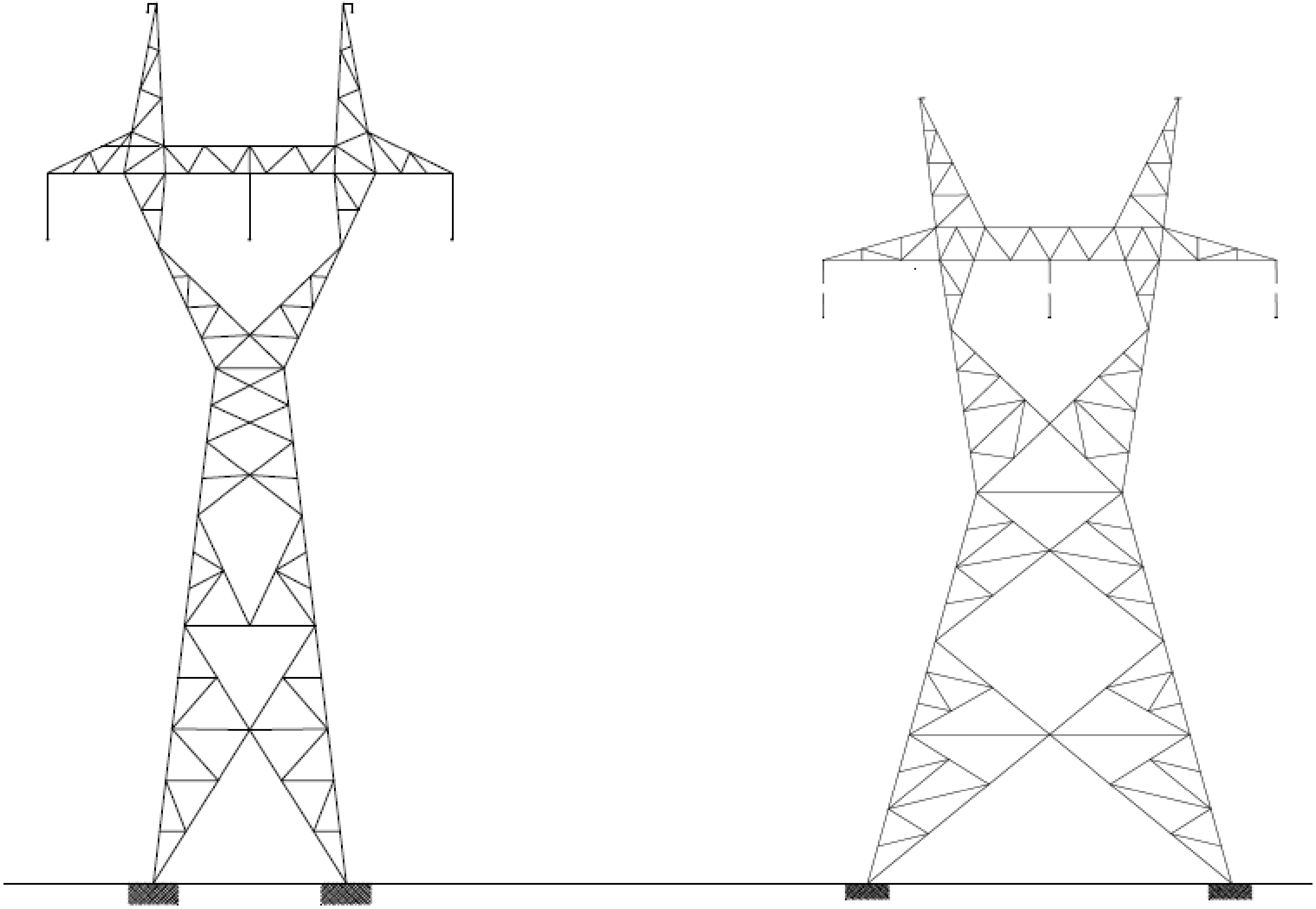


Figure 3.3-2: Y36V Typical Suspension Tower (left) and Heavy Angle / Dead End Tower (right)

3.3.1.4 Structures

Self-supporting lattice-steel support towers will be used to support the Project's single-circuit transmission line (Figure 3.3-2). The tower height will be 19-27 m, with a footprint of 6.3 x 6.3 m. If tower extensions are necessary at stream and transportation crossings the tower heights and footprints will increase.

Specialized double circuit towers will be used through Sage Creek (Figure 3.2-3). These towers will hold both V95L and Y36V.

Specialized heavy angle and dead-end structures will be required for line redirection and to terminate the transmission line at each of the stations. These structures will be single-circuit self-supporting lattice-steel towers (Figure 3.3-2). The heavy angle and dead-end tower heights will be 29.5 m, with a footprint of 14.9 x 14.9 m.

3.3.1.5 Conductors and Insulators

Line Y36V is a primarily single-circuit line configuration consisting of three 1272 MCM ACSR (Aluminum Conductors, Steel Reinforced) conductors. Each conductor consists of aluminum strands wrapped around a centre core of steel strands and will be suspended from each structure by insulator strings. The ground clearance will meet or exceed the requirements of Overhead Systems, C22.3 Standard No. 1-10 (CSA 2010). The minimum ground-to-conductor clearances for 230-kV power lines are:

- Farmland: 6.1 m
- Road and Highways Crossings: 6.325 m
- Railways: 9.3 m
- Underground Pipelines: 6.1 m
- Pedestrian only: 4.6 m
- Watercourse – Class 0: 6.1 m
- Watercourse – Class 1: 7.3 m
- Watercourse – Class 2: 9.3 m
- Watercourse – Class 4: 13.3 m

3.3.2 Station Modifications

Station modifications will be required to terminate the Projects at the St. Vital and La Verendrye stations. All station modifications and equipment additions will be conducted on existing Manitoba Hydro property and within the fenced area of each station.

3.3.2.1 St. Vital and La Verendrye Stations

Upgrades at both stations include additional equipment to terminate the new lines (detailed below) as well as revisions to the protection and communication systems.

The equipment below will be installed in breaker position R11 (Figure 3.3-3) at St. Vital Station and breaker position R12 (Figure 3.3-4) at La Verendrye Station.

1) Major 230-kV equipment installed at each station:
    - One 230-kV breaker
    - Three current transformers for breaker protection
    - One 3-phase centre break switch
    - 230-kV motor-operated centre-break switch with ground disconnect
    - Three 1-phase 230-kV transformers for line protection
2) 230-kV steel structures installed at each station:
    - One 3-phase support for current transformer
    - Three 1-phase voltage transformer supports
    - Three 3-phase centre-break disconnect switch supports
    - One 1-phase low-bus support
3) 230-kV foundations installed at each station:
    - One circuit-breaker foundation
    - One master control cabinet foundation
    - One current transformer support foundation
    - Three disconnect-switch structure foundations
    - One transformer support foundation
    - One 1-phase low-bus support foundation

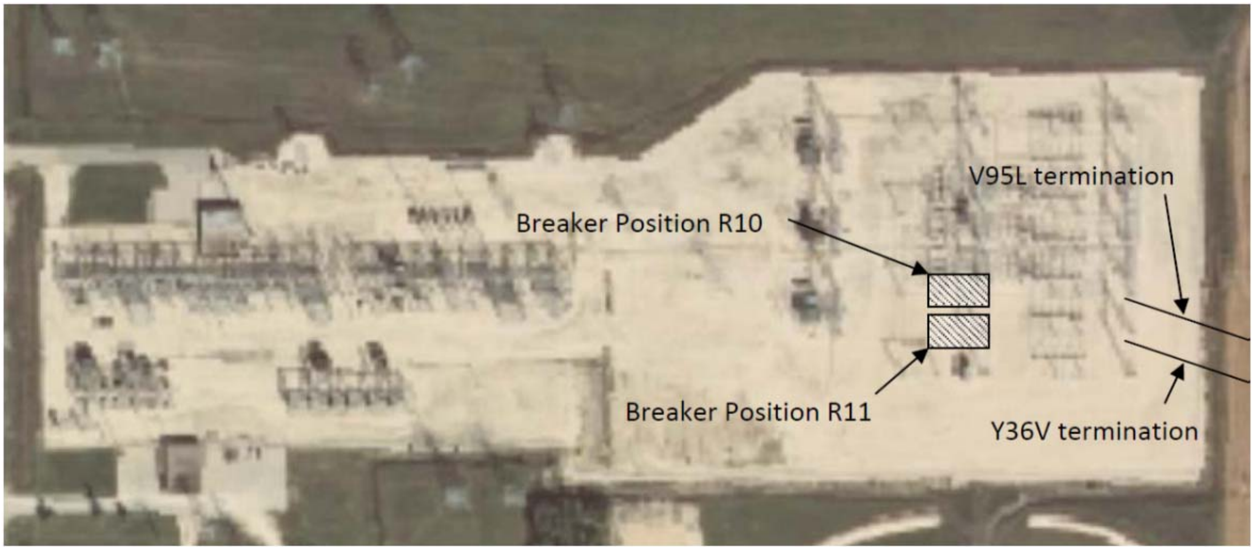


Figure 3.3-3: St. Vital Station Y36V Modifications

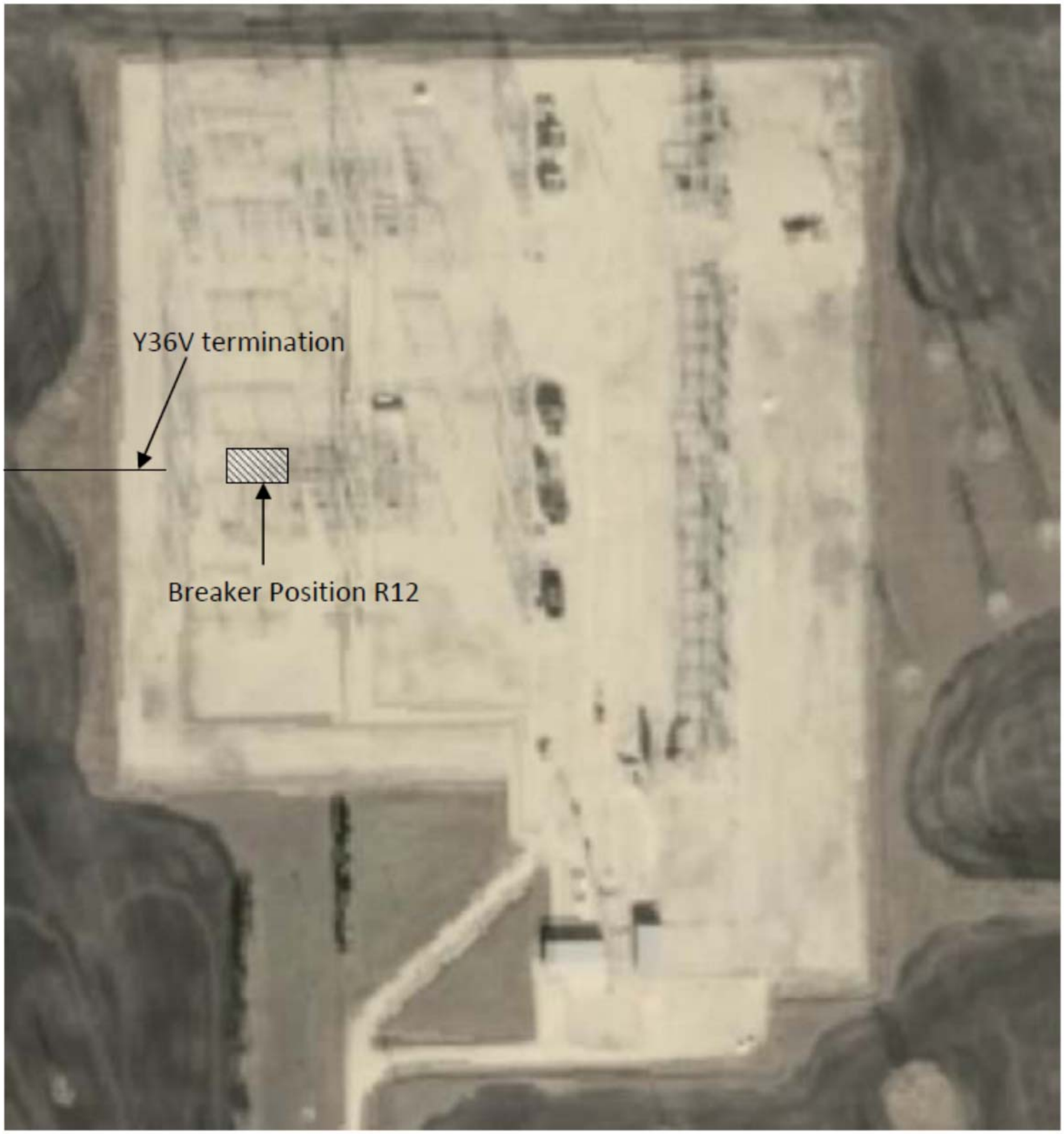


Figure 3.3-4: La Verendrye Station Modifications

3.4 PROJECT CONSTRUCTION

Construction will be carried out by contractors under the supervision of Manitoba Hydro. Transmission line construction will begin following the receipt of the Environment Act licence. Other work permits and/or authorizations will be obtained as required (e.g., Navigable Water approval). Manitoba Hydro will prepare an Environmental Protection Plan (EnvPP) for the Project that will incorporate any licence, permit or authorization conditions. In addition, Manitoba Hydro will prepare a detailed Construction Phase EnvPP for project construction. Both EnvPPs will outline site-specific mitigation and on-ground procedures for preventing or minimizing environmental effects from construction activities. Manitoba Hydro field staff and the contractors will be provided with copies of the Construction Phase EnvPP and licences/permits/authorizations.

All station modifications and equipment additions will be conducted within Manitoba Hydro's existing property and within the fenced area of each station. Only authorized Manitoba Hydro and contractor personnel will have access to the construction areas. If there is a need for alternative site access then access will be negotiated with the associated adjacent landowner.

3.4.1 Transmission Line

Property easements for the required ROW will be secured through direct negotiations with affected landowners. The route will then be surveyed to establish a centreline for the transmission line. The edges of the ROW will also be surveyed and flagged to establish the limits for tree clearing (where required). It is during this survey that tower locations will be established.

Transmission line construction will begin once the ROW is cleared. The basic construction steps involve foundations installation, framing and erection of structures, stringing of conductors, cleanup, and then commissioning.

Typical construction equipment includes:

- Drill rigs for drilling piles.
- Backhoes with attachments for installing piles.
- Excavators and cranes for erecting towers.
- Bulldozers and stringing equipment such as tensioners and pullers for stringing conductors and skywires.
- Material delivery trucks and trailers.
- Concrete trucks.
- Other smaller equipment for transportation and other minor tasks as required.

Access to construction sites will generally be from within the ROW. The ROW will be accessed at intersections with roadways or road allowances or from roadways adjacent to the transmission line in order to minimize the need for pioneering access trail development. Permission will be requested from landowners where access is across private property.

3.4.1.1 Right-of-Way Clearing

The ROW will be cleared to accommodate the Project. The total ROW clearing requirements, for V95L, will be 40 m.

The ROW will be cleared of trees and understory to allow for safe and reliable operation of the transmission line. Clearing will be modified in environmentally sensitive areas (e.g., river and stream crossings) and will be subject to a variety of predetermined but adaptable environmental protection measures. In forested areas, shrubs and herbaceous vegetation ground cover will be maintained as much as possible to provide soil stability and prevent erosion and sediment transport.

Clearing methods include machine clearing by “V” and “K-G” blades, mulching by rotary drums, selective clearing by feller bunchers, and hand clearing. Trees will be cut within 10 cm of the ground surface. Ground vegetation will only be grubbed at tower sites for foundation installation, access trails for equipment, or for worker safety. Danger trees identified beyond the ROW will also be removed. In environmentally sensitive areas, such as riparian zones adjacent to waterbodies, clearing will be conducted by hand. Tree removal in riparian zones along the ROW will be completed in accordance with the Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat (DFO and MBNR 1996).

Disposal of cleared vegetation typically involves a variety of options including piling and burning, mulching, collection and secondary use by local communities (e.g., firewood), or salvage and marketing of merchantable timber resources if feasible. The final ultimate method of vegetation disposal will be determined by the method of clearing used and the environmental licence conditions applied to the project.

3.4.1.2 Foundation Installation

Tower foundations for both lines will be cast-in-place concrete piles except in areas of special soil conditions. Pile foundations for suspension towers will be constructed by auguring 1.8 m (V95L) / 0.9 m (Y36V) diameter holes to a depth of 9 m below the surface. Pile forms will be placed in the holes and filled with concrete. Foundations for heavy angle or dead end structures will be constructed using the same methods above except the piles will be 2.44 m (V95L) / 1.2 m (Y36V) in diameter and extend to 10 m below the surface. Pile dimensions will vary to accommodate differences in ground conditions among tower sites.

3.4.1.3 Structure Erection

Structures will be assembled either onsite or assembled as components in a designated marshaling yard, transported to the construction site by truck, and erected by crane. Prior to structure erection the insulators will be attached to the cross-arms.

3.4.1.4 Conductor Installation

Reels of conductor will be transported to site by truck, as required. The conductors will be lifted to the insulators by crane. Conductor lengths will be connected using either implosive sleeves or hydraulic crimping. Conductor tensioning will be completed by machine to provide the pre-determined ground to conductor clearances.

3.4.1.5 Marshaling Yards

Marshaling yards will be used to store construction materials and equipment. The yards will be established on the ROW where possible, otherwise they will be near the transmission line route to minimize transportation requirements. The number and location of the marshaling yards will be determined once the final route has been licensed. Contractor specifications and agreements may influence the number and location of marshaling yards,

3.4.1.6 Granular Materials

Granular materials will be required during construction for granular back-fill and/or concrete batching for tower foundations. Granular materials will be purchased from local suppliers.

3.4.1.7 Waste Disposal and Cleanup

Waste materials will be disposed of through local contract services and will be subject to any licensing conditions. Temporary waste disposal will be undertaken in accordance with provincial and municipal regulations and bylaws. Once the transmission line has been completed, all materials, equipment, debris, and unused supplies will be dismantled, if required, removed from the site and disposed of according to provincial and municipal regulations. Reclamation of construction sites, including marshaling yards, will be undertaken as required.

3.4.1.8 Workforce Accommodations

No construction work camps will be required for the project. It is expected that local existing accommodations will be used for housing the construction workforce.

3.4.1.9 Workforce Requirements

Overhead transmission line construction workforce will range in number from about 10 personnel per month, during mobilization and demobilization phases, to a maximum of 100 personnel per month during peak construction periods.

The overhead line construction (including foundations, structure assembly, staking, and stringing) will be conducted from June 2016 to June 2017 (V95L) and July to December 2017 (Y36V) and will involve an estimated 1,410 person-months of activity to complete line construction.

ROW clearing will be conducted from August 2016 to March 2017 for V95L and July to November 2017 for Y36V. A crew of 30-40 is expected for clearing. These timeframes may shift depending on when the licence is received and conditions of the licence and any required permits satisfied.

3.4.2 Station Modifications

3.4.2.1 Workforce Accommodations

No construction work camps will be required for the project. It is expected that local existing accommodations will be used for housing the construction workforce.

3.4.2.2 Workforce Requirements

The expected construction workforce for the St. Vital, La Verendrye, and Letellier equipment additions is about 187 person-months of construction activity over the twenty-seven month period from October 2015 to December 2017. This includes an estimated five to six workers from October 2015 through August 2017 for civil construction; estimated five to six journeymen electricians over 11 months to complete the electrical work from November 2015 through December 2017; estimated 11 workers over 11 months to complete structure and bus work installations and equipment stands from November 2015 through December 2017.

3.5 OPERATION AND MAINTENANCE

3.5.1 Transmission Line

The transmission line will be designed to operate continuously although the actual flow of electricity will vary with load requirements. In order to maintain the transmission line in a safe and reliable operating condition, regular inspection and maintenance must occur. This will include inspections of ROW vegetation as well as structures, hardware and station equipment. Regular inspections typically occur on an annual basis.

The inspections of the transmission line can include air patrols, grounds patrols and non-scheduled maintenance by air or ground in the event that unexpected repairs are required.

Ground travel can include snow machine, all-terrain vehicle, or light truck. Helicopters may be used in certain areas. In winter, equipment operations may include a soft track groomer to facilitate access where snow conditions otherwise restrict travel on the right-of-way.

In circumstances where maintenance activity requires the use of access trails off the right-of-way (e.g., difficult terrain), approval is first obtained from Manitoba Conservation, when on provincial Crown land, and through formal easement or Crown land reservations where necessary. In areas where access to or across private lands is required, or if working on an easement on private lands, the landowners are contacted in advance. In the case of herbicide application, Manitoba Hydro also contacts landowners adjacent to the right-of-way.

The operations and maintenance phase of the project will adhere to a Manitoba Hydro Operations Phase EnvPP developed for the Project.

Maintenance procedures are well established and are the subject of continuously updated corporate guidelines for maintenance and construction activities. Maintenance activities include instances where crews are required to obtain access to specific areas to repair deficiencies on the transmission system.

3.5.1.1 Electric and Magnetic Fields and Corona

Metal objects (fences, metal sheds, etc.) that run parallel to 230-kV transmission lines are subject to induced voltages. Induced voltages vary with proximity of the structure to the transmission line, material and construction, and the length of the parallel run.

To protect the landowner, livestock and the general public, standard grounding procedures will be defined for any structures running parallel to the transmission line. Manitoba Hydro will work with any landowners, in which this may be a concern, to provide the necessary grounding for any of these structures.

3.5.1.2 Line Maintenance Procedures

Transmission line maintenance could include anything from minor repairs to full replacement of any component of the transmission line. Manitoba Hydro maintains a corporate manual for transmission line construction and maintenance procedures which is continuously updated.

3.5.1.3 Workforce Requirements

Work force requirements associated with the operations and maintenance of a particular transmission line generally involve deployment of established regional operations and maintenance personnel, and contractor staff as required. Line inspections could involve concurrent inspections of various lines in the region. Maintenance would include repairs as required. These work workforce requirements would vary greatly depending on the deficiencies being repaired. The workforce may include hydro staff or contractors depending on the work required and availability of maintenance crews.

3.5.1.4 Vegetation Management

Manitoba Hydro will follow the Transmission Line and Transmission Station Vegetation Management Practices document (Manitoba Hydro 2007) for all vegetation management on the ROW.

In addition, the Agricultural Biosecurity Policy and Standard Operating Procedures will be applied. The policy is designed to prevent the introduction and spread of disease, pests and invasive plant species in agricultural land and livestock operations

A variety of vegetation management methods are available, including physical, chemical, and biological control techniques. The application of vegetation management is dependent on the location, costs, and the environmental sensitivity of the site.

Vegetation management methods include:

- Hand cutting: hand-cut trees using chainsaws, brushsaws, axes and brush hooks. Where local conditions permit, hand-cut deciduous trees might be stump treated with an approved herbicide to prevent re-growth. In areas were herbicide application is not an option more frequent follow-up maintenance will be required to address regrowth.
- Mechanical Cutting: Mechanical cutting is generally used where dense tree growth reoccurs on the ROW and the site is not environmentally sensitive (e.g., riparian zones). Follow-up maintenance is usually required within two to three years to manage suckering and re-growth.
- Winter Shearing: This is used when the ground is frozen and is performed by a tracked vehicle equipped with “V” or “K-G” blades to clear trees with a trunk diameter greater than 2.5 cm. Trees are sheared up approximately 6 cm above the ground surface to minimize damage to the ground cover and soil disturbance.
- Herbicide Treatment: Herbicides are used to provide long-term control of tree growth problems and are generally applied in follow up to mechanical methods. All herbicide applications will be completed and supervised by licensed applicators and in accordance with a Pesticide Use Permit. Herbicide application rates will be determined by the Manitoba Hydro Chief Forester in accordance with product label instructions. Herbicide application methods include:
  - Broadcast stem or foliar application equipment such as machine applicators and hose and handgun applicators are used for controlled droplet applicators for tree heights of 2.5 m or less.

- Selective stem applicators such as hose and gun sprayers are the preferred method of application for trees less than 2.5 m in height.
- Basal treatment applications are used for a direct spray onto the lower 20 cm of the tree stem or root collar. This can be completed in any season and is generally used for tree growth over 2.5 m.
- Stump treatment is used following hand cutting, where practical, to provide selective control of suckering deciduous tree species and to minimize effects on desirable species.
- Tree injection methods might also be used on trees over 2.5 m, subject to aesthetic impact considerations.
- Biological Control is a method of encouraging competing plant species, planting and maintaining desirable plant species, encouraging wildlife use or encouraging secondary use of the ROW.

Weed control in cultivated and uncultivated areas of the ROW is the responsibility of the landowner and included in the landowner compensation package for easement. Prior to any vegetation management work on private property, notification will be provided to the landowner or authority. On Provincial Crown Lands, a work permit will be obtained under the *The Wildfires Act* or *The Crown Lands Act*. In cases where private property is adjacent to Provincial Crown Lands, adjacent landowners will also be contacted in advance of the work. The Chief Forester is responsible for obtaining the necessary Pesticide Use Permits and submitting Post-season Control Reports as required by *Manitoba Regulation 94/88R*.

3.5.2 Station Modifications

The transmission stations are not manned on a continual basis; however, routine inspections and maintenance operations are required to ensure safe and reliable operation. Oils and gases are typically required to provide an insulating medium for equipment within substations. These are required for the safe operation of the station's equipment. The modifications to the St. Vital, Letellier and La Verendrye Stations will include:

- 230-kV Capacitive Voltage Transformer
  - Mineral Oil – 120 litres (3 x 30 litres)
  - Dielectrol Fluid PXE – 51 litres (3 x 17 litres) – used as an electric insulator

The station yard surfacing would be utilized to contain the oil until a cleanup could be done. Concrete curbing or protective dykes may be installed to corral the oil to remain near the failed equipment. Weed control within stations is necessary for the operating reliability of equipment as well as the safety of personnel working within the stations. Areas of the stations that will be modified or to which equipment will be added will be included in existing site maintenance procedures and activities. The operations and maintenance phase of the station will adhere to the Manitoba Hydro Operations Phase EnvPP developed for the Project.

3.6 PROJECT DECOMMISSIONING

The Project has been designed to remain in service for several decades and with regular maintenance could be operated indefinitely.

Should transmission lines be decommissioned at some future date, Manitoba Hydro has tentatively identified acceptable means for environmentally restoring project sites and rights-of-way. Established procedures are available for the decommissioning of temporary infrastructure or facilities (e.g., borrow pits, access trails, marshalling areas, mobile construction camps, etc.).

Current methods of transmission line decommissioning entail the dismantling of the structures and salvage or disposal of all steel structure components, as well as removal and salvage of insulators, conductors and ground wires.

Decommissioning of rights-of-way, currently involves clean-up and/or remediation to a standard commensurate with local environmental conditions, including the existing land use and policy with respect to future development.

Decommissioning of marshalling yards currently involves the removal of all new and used equipment and materials, dismantling of any ancillary equipment or structures, and the remediation of the yard property.

3.7 PROJECT SCHEDULE

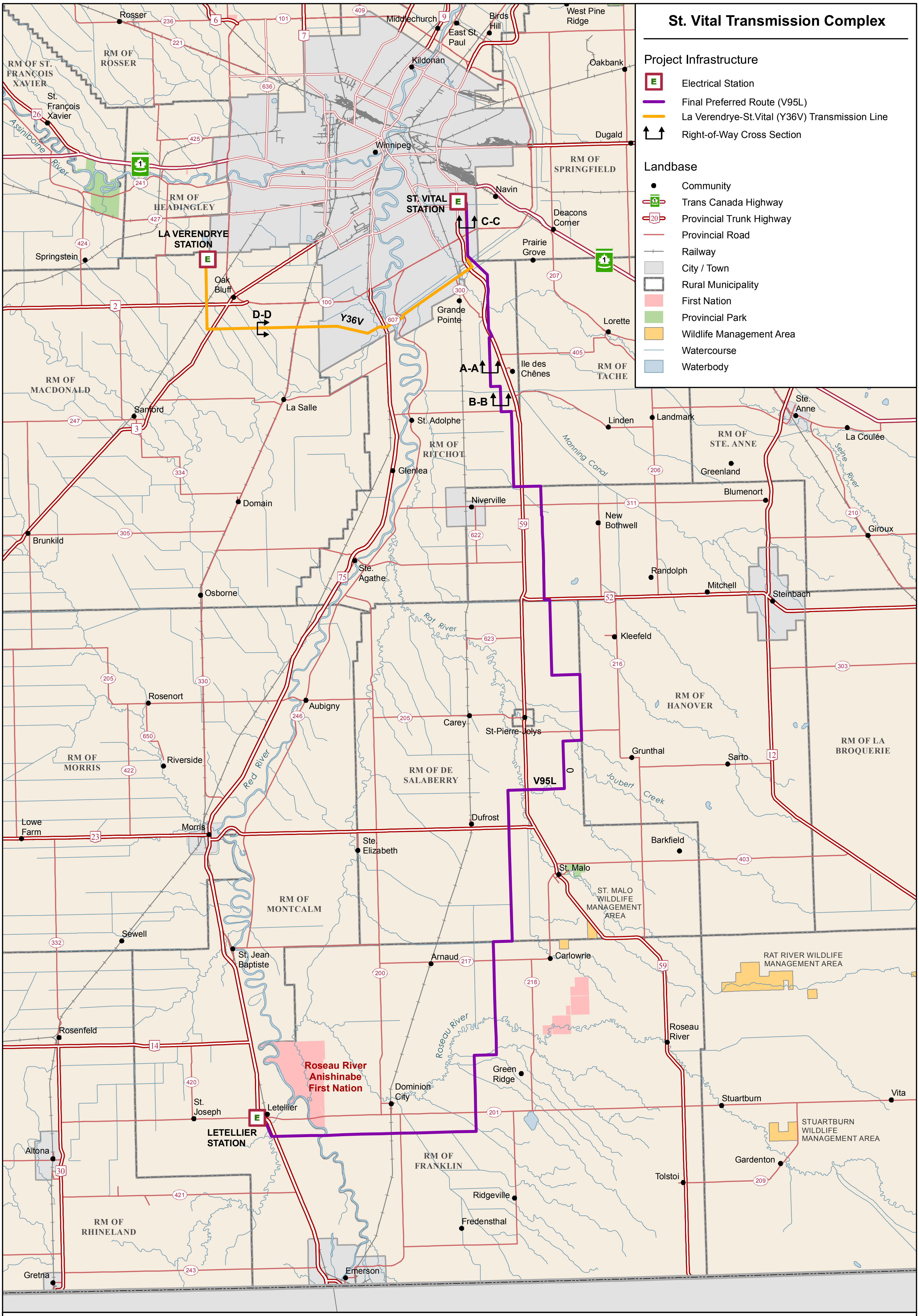
The anticipated in-service date (ISD) for V95L is July 2017 and February 2018 for Y36V. To meet these timelines, tasks are anticipated to be completed according to Table 3.7-1.

Table 3.7-1: St. Vital Transmission Complex Project Schedule

Project Task	Target Date
EA Report and EAPF Submission	May 2014
Receipt of licence under *The (Manitoba) Environment Act*	December 2014
Property Appraisals and ROW acquisition (V95L)	August 2016
Clearing of the ROW (V95L)	March 2017
Transmission Line Construction (V95L)	June 2017
Commissioning (V95L)	July 2017
In-Service Date (V95L)	July 2017
Property Appraisals and ROW acquisition (Y36V)	March 2015

Table 3.7-1: St. Vital Transmission Complex Project Schedule

Project Task	Target Date
Clearing of the ROW (Y36V)	November 2017
Transmission Line Construction (Y36V)	December 2017
Commissioning (Y36V)	January 2018
In-Service Date (Y36V)	February 2018



Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 21, 2014

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Project Infrastructure

Map 3-1

4.0 ENVIRONMENTAL ASSESSMENT PROCESS

4.1 OVERVIEW OF APPROACH

The following is an overview of the methods that were used to conduct this environmental assessment (EA). This EA Report was completed to meet the requirements of *The (Manitoba) Environment Act* and the Environment Act Proposal Report Guidelines Information Bulletin (Manitoba Conservation and Water Stewardship 2014). These methods have been developed through a review of regulations, current practice in environmental assessment and experience on assessments of similar projects (Maxim Power 2009; Jacques Whitford Stantec Limited 2009).

Project-related environmental effects and cumulative environmental effects were assessed using a standard framework for each VC, with standard tables and matrices to facilitate and document details of the assessment. Residual Project-related environmental effects (i.e., after mitigation has been applied) were characterized using specific criteria, see Section 4.2.4.The significance of the Project-related environmental effects was then determined based on pre-defined criteria or thresholds (also called significance criteria), see Section 4.4. If there was an identified potential for the residual environmental effects of the project to interact cumulatively with the residual environmental effects of other projects or physical activities, these cumulative environmental effects were assessed.

4.2 SCOPING THE ASSESSMENT

4.2.1 Selection of Valued Components and Key Indicators

The first step in scoping the assessment is the selection of Valued Components (VCs) and Key Indicators (KIs). VCs encompass both biophysical and socioeconomic components of the environment that could be affected by the Project and were the focus of this EA. The process for selection of VCs is described in Section 5.2.

KIs provide information on ecosystem integrity and health and can assist in gauging conditions within a specified area. KIs may include individual plant or wildlife species or communities, or components of the physical or socioeconomic environment, such as surface water quality or income. For biophysical VCs, selection of KIs is focused on those species with a narrow range of ecological tolerance in a given area (Canadian Environmental Assessment Agency 2009) or components that are representative of the health of a system. KIs are components of the environment that may be included in follow-up monitoring programs to evaluate trends within the ecosystem.

4.2.2 Project Interactions with the Valued Components

4.2.2.1 Identification of Project Effects

Potential Project-related environmental effects are changes to the biophysical or human environment that will be caused by a project or activity arising solely as a result of the proposed physical activities associated with the Project. Potential environmental effects can be classified as either adverse or positive.

In the Effects Assessment and Mitigation chapter (Chapter 9), interactions between activities and project phases and potential environmental effects identified for each VC are ranked according to the following criteria:

> 0 = No interaction.
>
> 1 = Interaction may occur; however, based on past experience and professional judgment, the resulting environmental effect is well understood and can be managed to acceptable levels through General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). No determination of significance of residual effects or cumulative effects assessment is warranted.
>
> 2 = Interaction may occur, and the resulting environmental effect may exceed acceptable levels without implementation of project-specific mitigation. Further assessment is warranted.

The significance of project effects was determined for effects that have a valid interaction pathway. A ranking of 0 or 1 indicates that there are no significant adverse environmental effects. All VCs with interactions ranked 2 were carried forward to an assessment of project-related and cumulative environmental effects that includes significance determination.

4.2.2.2 Selection of Measureable Parameters

One or more measurable parameter(s) (e.g, water quality parameters) was selected to facilitate quantitative or qualitative measurement of potential Project environmental effects and cumulative environmental effects. Measurable parameters provide a means to predict the amount of change to a VC as a result of an environmental effect. The degree of change to the measurable parameters was used to help characterize Project-specific and cumulative environmental effects and evaluate the significance of those, where applicable.

4.2.3 Boundaries

Consideration of environmental effects in the EA is conceptually bound in both time and space. The spatial and temporal boundaries vary among VCs, depending on the nature of the predicted environmental effects. The assessment of environmental effects may also be bounded by administrative and technical constraints.

4.2.3.1 Spatial Boundaries

Spatial boundaries for the assessment were established to support the evaluation of alternative routes, assessment of Project environmental effects and assessment of cumulative environmental effects, respectively. Boundaries were selected taking into account the geographic range of the anticipated environmental effects of the Project and ecological, technical, and social considerations and included the following:

- A Project Siting Study Area (PSSA) was defined that encompassed a larger planning area in which alternative routing options will be considered. It was used for the alternative route evaluation and preferred route selection only.
- A Project Development Area (PDA) was defined that is the area represented by the physical Project footprint, and consists of the area of physical disturbance associated with the Project facilities.
- The Local Assessment Area (LAA) is the maximum area within which Project-related environmental effects can be predicted or measured with a reasonable degree of accuracy and confidence. The LAA includes the PDA and any adjacent areas where Project-related environmental effects may reasonably be expected to occur. The definition of the LAA varies from one VC to another, depending on local conditions, species abundance, socioeconomic factors, cultural values, and other factors.
- The Regional Assessment Area (RAA) encompasses the area where Project-specific environmental effects overlap with those of past, present, and reasonably foreseeable future projects and activities. It is used to provide regional context, and is therefore generally the area for which the Project’s contribution to cumulative effects is assessed. The RAA was defined for each VC depending on physical and biological conditions and the type and location of other past, present, or reasonably foreseeable projects or activities that have been or will be carried out.

4.2.3.2 Temporal Boundaries

Temporal boundaries identify when an environmental effect may occur in relation to specific Project phases and activities. The temporal boundaries are based on the timing and duration of Project activities and the nature of the interactions with each VC. Temporal boundaries for the Project include the following phases:

- Construction
- Operation and maintenance

The project has been designed to remain in service for several decades and with regular maintenance, could be operated indefinitely. If and when decommissioning of the transmission lines or stations is required, this will be completed in accordance with the federal, provincial and municipal regulations in force at the time. For this reason, decommissioning is not part of the temporal boundaries for this assessment.

4.2.3.3 Administrative and Technical Boundaries

Administrative boundaries refer to the constraints on the EA for political, socio-cultural, and economic reasons. Examples of administrative boundaries include rural municipalities, wildlife management areas, and land and resource management plan boundaries. Technical boundaries represent the technical limitations on the ability to evaluate or predict potential environmental effects of the Project (e.g., modelling limitations). Where such technical boundaries existed, they were acknowledged, and alternative strategies used to characterize environmental effects were described. The administrative and technical boundaries for each VC are described in their respective sections.

4.2.4 Characterizing Residual Environmental Effects

Residual Project environmental effects were characterized and presented in an environmental effects summary table, where appropriate. Environmental effects were characterized for each Project phase, where applicable. Several criteria or effect attributes were taken into account to characterize the nature and extent of the environmental effects on a VC; these include:

- direction
- magnitude
- geographic extent
- duration
- frequency
- reversibility
- ecological and socio-cultural context
- likelihood of significant effects

Each environmental effects summary includes a key that provides a definition of each criterion listed above. The summary includes proposed mitigation and monitoring/follow-up measures.

4.2.5 Standards or Thresholds for Determining the Significance of Environmental Effects

Criteria were specifically defined for each VC to provide the standard or threshold for determining the significance of residual adverse environmental effects.

These standards or thresholds were generally selected in consideration of provincial and federal regulatory requirements, standards, objectives, guidelines that are applicable to the VC, societal values, or other planning objectives. Thresholds or standards were developed in consideration of guidance and past practice, and adapted to the specific conditions of the receiving environment of the Project and the nature of the potential environmental effects.

Where standards set by guidelines or regulations did not exist, a threshold was developed. Thresholds present the limits of an acceptable state for a VC or measurable parameter, based on resource management objectives, scientific literature, or ecological processes (e.g., desired states for fish or wildlife habitats or populations). In the absence of standards, the threshold was defined by the Project team.

4.3 ASSESSMENT OF ENVIRONMENTAL EFFECTS

Following the scoping of the environmental assessment for each VC, the potential project and cumulative environmental effects was assessed, where appropriate.

4.3.1 Assessment of Project Environmental Effects

Project-related environmental effects were assessed. The steps in assessment consisted of:

- Describing and quantifying, where possible, how an environmental effect will occur through an analysis of the project interactions with the environment.
- Describing the mitigation and environmental protection measures proposed to reduce or eliminate the environmental effect.
- Evaluating and characterizing the residual environmental effects of the project (i.e., environmental effects remaining after application of mitigation measures) on the biophysical and human environment for each development phase.

The assessment of each potential project environmental effect began with a description of the mechanisms whereby specific project activities and actions could result in the environmental effect. A table showing the project facilities and physical activities that cause the effect is presented. Table 4.3-1 is an example of such a table.

Table 4.3-1: Example: Potential Project Environmental Effects VC1

Project Facilities and Physical Activities	Environmental Effect 1	Environmental Effect 2	Environmental Effect 2
Construction:			
Activity 1			
Activity 2			
Activity 3			
Operation:			

Table 4.3-1: Example: Potential Project Environmental Effects VC1

Project Facilities and Physical Activities	Environmental Effect 1	Environmental Effect 2	Environmental Effect 2
Activity 1			
Activity 2			
Activity 3			

Where possible, the spatial and temporal extent of these changes (i.e., where and when the environmental effect might occur) was also described. Available data was analyzed to qualify and quantify (where possible) the potential effects of this interaction on measurable parameters. The significance of environmental effects before mitigation are not assessed (i.e., significance is only assessed for residual effects).

4.3.1.1 Mitigation of Project Environmental Effects

Mitigation measures that will help avoid, reduce or eliminate an environmental effect were described, with an emphasis on how these measures will help alter the environmental effect. Where possible, the effectiveness of the proposed mitigation was expressed in terms of the expected change in the measurable parameters for the VC.

All mitigation measures and environmental commitments will be documented and communicated using a project-specific environmental protection plan (EnvPP), created after receipt of the licence. This allows any specific licence conditions to be included in the EnvPP.

4.3.1.2 Characterization of Residual Project Environmental Effects

Residual environmental effects were described, relative to each project phase taking into account how the proposed mitigation will alter or change the environmental effect.

Residual environmental effects were characterized in terms of the direction, magnitude, geographic extent, frequency, duration, reversibility and ecological or socio-economic context (FEARO 1994; Hegmann et al 1999). Where possible, these characteristics were described quantitatively for each residual environmental effect. Where these characteristics could not be expressed quantitatively, at minimum, they were described using qualitative terms that were defined specifically for the VC or environmental effect. A table summarizing the residual project environmental effects was presented. Table 4.3-2 is an example of such a table.

Table 4.3-2: Example: Summary of Residual Project-related Environmental Effects on VC1

Project Phase	Residual Environmental Effects Characterization							Significance	Likelihood of Significant Effect
	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context		
Environmental Effect 1									
Construction									
Operation									
Environmental Effect 2									
Construction									
Operation									
Environmental Effect 3									
Construction									
Operation									

KEY:

Direction:
P = Positive
A = Adverse
N = Neutral

Magnitude:

Geographic Extent:

Duration:

Frequency:

Reversibility:
R = Reversible
I = Irreversible

Environmental Context:

Significance:
S = Significant
N = Not Significant

Likelihood of Significant Effect Occurring:
L = Low probability of occurrence
M = Medium probability of occurrence
H = High probability of occurrence

4.3.2 Assessment of Cumulative Environmental Effects

Residual environmental effects were assessed for their potential to act cumulatively with the effects of other projects and physical activities that have been or will be carried out. The project environmental effects that are likely to interact cumulatively with other projects and physical activities were identified. The cumulative environmental effects were assessed and their significance determined, where appropriate. This was followed by an analysis of the project's contribution to the change in cumulative effects.

4.3.2.1 Identification of Project Effects Likely to Interact Cumulatively

Two conditions must be met for the project to act cumulatively with the environmental effects of other projects and physical activities:

- There are residual project environmental effects on the VC.
- The residual effects act cumulatively with environmental effects of other projects or physical activities.

Table 4.3-3 is an example of the interactions between other projects and physical activities that may interact cumulatively with the project environmental effects on a VC. Where the project environmental effects act cumulatively with the effects of other projects and physical activities, a cumulative effects assessment is undertaken and the significance of residual cumulative environmental effects is determined.

Table 4.3-3: Potential Cumulative Environmental Effects on VC1

Other Projects and Physical Activities with Potential for Cumulative Environmental Effects	Potential Cumulative Environmental Effect on VC1		
	Environmental Effect 1	Environmental Effect 1	Environmental Effect 1
Project/Physical Activity 1			
Project/Physical Activity 2			
Project/Physical Activity 3			

Notes:

Cumulative environmental effects were ranked as follows:

0 = Project environmental effects do not act cumulatively with those of other projects and activities.

1 = Project environmental effects act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of beneficial management or codified practices.

2 = Project environmental effects act cumulatively with those of other projects and activities and the resulting cumulative effects may exceed acceptable levels without implementation of project-specific or regional mitigation.

4.3.2.2 Assessment of Cumulative Environmental Effects

Cumulative environmental effects were assessed following the same format as used for project effects: description and analysis of cumulative environmental effects, mitigation for cumulative environmental effects and characterization of residual cumulative environmental effects. The assessment was carried through for each environmental effect that interacts with those of other projects and physical activities.

4.3.2.2.1 Description and Analysis of Cumulative Environmental Effects

The environmental effects from other projects and physical activities that will act cumulatively with those of the project were identified. The mechanisms for the interaction were presented and, where possible, the spatial and temporal extent of the interactions was described. Available data was analyzed to qualify and quantify the potential cumulative effect on VC measurable parameters and key indicators.

4.3.2.2.2 Mitigation of Cumulative Environmental Effects

Based on the analysis above, any mitigation that could ameliorate the cumulative environmental effects, in addition to that presented for the project effects, was identified. Given the interaction of physical activities outside the control of Manitoba Hydro, consideration was given to collaborative initiatives which may involve the proponents of those physical activities as well as other third parties (e.g., governments, Aboriginal groups, NGOs). In some cases, analysis concluded that there were no additional mitigation measures that could be implemented.

4.3.2.2.3 Characterization of Residual Cumulative Environmental Effects

Residual cumulative environmental effects were described in a manner similar to the description of residual project environmental effects. The characterization considered the cumulative effects of three cases;

- The baseline case, represented by the existing conditions, presents the characterization of cumulative effects of past and existing projects and physical activities.
- The project case presents the assessment of cumulative effects of past and existing projects and physical activities plus the project.
- The future case presents the assessment of cumulative effects of past and existing projects and physical activities plus the project plus planned projects and physical activities.

4.3.2.2.4 Summary of Cumulative Environmental Effects

Following the assessment of cumulative environmental effects on each of the project environmental effects on the VC, a summary table is presented. Table 4.3-4 is an example of such a table. The determination of significance of the cumulative environmental effect will be discussed in the next section.

Table 4.3-4: Summary of Cumulative Effects on VC1

Case	Other Projects, Activities and Actions	Residual Cumulative Environmental Effects Characteristics							Significance	Likelihood
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Ecological/ Socio-economic Effect		
Cumulative Environmental Effect 1										
Cumulative Environmental Effect with Project										
Project Contribution to Cumulative Environmental Effect										
Cumulative Environmental Effect 2										
Cumulative Environmental Effect with Project										
Project Contribution to Cumulative Environmental Effect										

KEY:

Direction:
P = Positive
A = Adverse
N = Neutral

Magnitude:

Geographic Extent:

Duration:

Frequency:

Reversibility:
R = Reversible
I = Irreversible

Environmental Context:

Significance:
S = Significant
N = Not Significant

Likelihood of Significant Effect Occurring:
L = Low probability of occurrence
M = Medium probability of occurrence
H = High probability of occurrence

4.4 DETERMINATION OF THE SIGNIFICANCE OF RESIDUAL ENVIRONMENTAL EFFECTS

The significance of project environmental effects was determined using standards or thresholds that are specific to the VC or the measurable parameters used to assess the environmental effect.

- For cumulative environmental effects, the determination of significance is made for the overall cumulative environmental effect (i.e., the environmental effect of all past, present and reasonably foreseeable projects and activities in combination with the environmental effect of the project).

In cases where significant environmental effects are identified, the likelihood of their occurrence is evaluated (FEARO 1994, Hegmann et al. 1999).

4.5 FOLLOW-UP AND MONITORING

Follow-up and monitoring required to verify environmental effects predictions and assess the effectiveness of mitigation was recommended, following requirements from Environment Act Proposal Report Guidelines Information Bulletin (Manitoba Conservation and Water Stewardship 2014).

Recommended follow-up and monitoring programs were described for each VC or environmental effect, as appropriate. Details of recommended follow-up and monitoring were also included in a project-specific Environmental Protection Plan.

4.6 ACCIDENTS, MALFUNCTIONS AND UNPLANNED EVENTS

The potential for accidents, malfunctions and unplanned events was assessed. Where possible, potential events were identified using historical performance data for other similar projects at a regional, provincial, national or international scale, as appropriate. For each of the events considered, a possible scenario relating to how the event might occur during the life of the project is developed.

For each scenario, each discipline conducted a preliminary review to determine if the scenario is likely to affect the VC. Potential interactions were ranked using the same criteria as for the project-environment interactions.

Potential environmental effects on the VC were assessed in a similar fashion to project environmental effects. Environmental effects were characterized using the same terms as routine project environmental effects. The significance of the environmental effect was then determined using the same thresholds as determined for the routine project environmental effect.

5.0 VALUED COMPONENT SELECTION AND PROJECT ENVIRONMENT INTERACTIONS

5.1 INTRODUCTION

A valued component (VC) is some constituent of the biophysical or socio-economic environment that is of particular value due to an ecological, resource utilization, scientific, health, aesthetic, cultural or spiritual importance and which has the potential to be affected by development of the project. A VC may also be selected because it has the potential to have an effect on the project. A VC must be of some importance and must have the potential to be affected by, or to affect, the Project. As the VC has the potential to be affected, this means there is some interaction, either directly or indirectly, between the environmental component and some component or activity associated with the project during planning, construction, or operation. In this way, the assessment was focused on the assessment and management of the potential effect.

5.2 SELECTION OF VALUED COMPONENTS

The selection of VCs was based on consideration of several factors, including a review of VCs in previous EAs on transmission lines; consideration of input from the public, stakeholders, and Aboriginal peoples (as applicable); and the professional judgment of the EA team.

A potential list of VCs was presented to the public at open houses and to stakeholders at workshop sessions. Subsequently, this list was amended in consultation with discipline specialists and was expanded in some instances and combined in others. For example, the wildlife VC was expanded into species of conservation concern; in addition to birds; and mammals. Conversely, the aesthetics, public safety and human health VCs were combined into a Communities VC. The final VCs selected are shown in Table 5.2-1.

Table 5.2-1: Selected Valued Components and Rationale for Inclusion

Valued Component	Rationale for Inclusion
Atmospheric Environment	Atmospheric environment, and particularly air quality, is important to people, wildlife and vegetation. The potential environmental effect on air quality is assessed in the EA.
Groundwater Resources	There is potential for interaction with groundwater during drilling for tower foundations. This interaction is particularly important in areas with artesian conditions.

Table 5.2-1: Selected Valued Components and Rationale for Inclusion

Valued Component	Rationale for Inclusion
Aquatic Resources	Generally, transmission line development has limited potential to affect aquatic habitat. This VC is included to address wetlands that may be affected and stream crossings, especially on watercourses supporting species of conservation concern (SOCC). Also, aquatic resources could be negatively affected by spills or accidents or from herbicide application for vegetation control.
Wildlife	Wildlife is important to people, including First Nations and Métis. They are also important to regulatory authorities and, in some cases, have regulated status as species at risk. The wildlife VCs considered in this assessment were species listed under the *Species at Risk Act* (SARA) and Species of Conservation Concern (SOCC), as well as Mammals and Birds.
Natural Vegetation	The Project is in an area of Manitoba that historically supported tall grass prairie habitat. This habitat is among the most endangered in North America and it supports many plant and animal species of concern to regulators and others.
Traditional Land Use and Resource Use	It was recognized that there is potential for development of this Project to affect traditional land use by First Nations and Métis. In particular, this Project is in close proximity to Roseau River Anishinabe First Nation, and to other lands of importance to this community. The Manitoba Métis Federation (MMF) has also indicated that their members have land use and interests in the area.
Infrastructure and Services	During Project construction in particular, there is potential for effects on the transportation network and on services in the Project area. Though these are not expected to be substantive, they are assessed further in the document.
Employment and Economy	There is some potential for benefits to local business during project construction and additional benefits to the local economy during project operations.
Property and Residential Development	Manitoba Hydro recognizes that effect on property value is a concern regarding transmission line development. This concern was raised during engagement activities for this project.
Agricultural Land Use	Based on the location of the Project, effects on agricultural practices was seen as one of the major areas of concern from local residents. The potential for effects and mitigation and compensation measures are discussed under this VC.
Non-agricultural Land Use	Concerns were raised during engagement regarding potential effects on other land use practices, mainly recreational.

Table 5.2-1: Selected Valued Components and Rationale for Inclusion

Valued Component	Rationale for Inclusion
Communities	This VC discusses potential for effects on public safety, human health and aesthetics. These areas are of concern to local residents, regulators and other government departments.
Heritage Resources	Heritage resources are protected by legislation and must be considered in any development that has the potential to affect them. Excavating for tower foundations and clearing at stream crossings (among other activities) would have this potential to disturb heritage resources.

5.3 PROJECT-ENVIRONMENT INTERACTIONS

The assessment of Project effects on the environment begins with an understanding of which project activities and physical works interact with the VCs. The identification of these interactions allows the EA to focus on the issues of greatest concern. A matrix was developed by listing the project activities and physical works and noting where they have the potential to interact with the VCs. The interactions were identified by the discipline specialists based on experience with similar projects and a review of previous transmission line environmental assessments. Table 5.3-1 is an interaction matrix for the Project.

Table 5.3-1: Project-Environment Interactions

Project Activities/Physical Works	Atmospheric Environment	Groundwater Resources	Aquatic Environment	Wildlife	Natural Vegetation	Traditional Land and Resource Use	Infrastructure and Services	Employment and Economy	Property and Residential Development	Agricultural Land Use	Non-agricultural Land Use	Communities	Heritage Resources
Construction Phase													
Clearing	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Drilling	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓
Marshalling Yards	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tower Installation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Stringing Conductors	✓				✓		✓	✓	✓	✓	✓	✓	
Presence of Materials and Equipment	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	
Site Reclamation	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Operations and Maintenance Phase													
Project Presence			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Maintenance of Infrastructure	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vegetation Management	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓

Those interactions with a checkmark are assessed in Chapter 9.

6.0 EXISTING ENVIRONMENT

The existing environmental conditions in the vicinity of the Project (Project Area or Regional Study Area) are provided in this chapter. The details provided are based on existing literature, database searches and other information that is available for the Project Area, and are supplemented by field studies where needed. The Project Area for the St. Vital Transmission complex is not fixed in size for all environmental components discussed below, but in all cases encompasses all proposed project components.

6.1 PHYSICAL ENVIRONMENT

6.1.1 Climate

The Project Area overlaps with a number of Ecoregions within the Prairie and Boreal Plains Ecozones (Smith et al.1998; Map 6-1). The area is characterized by large seasonal variations in temperature and precipitation with long, cold winters and short, warm summers. Climate data were obtained from three Environment Canada (EC) meteorological stations which are located north, central-east and south of the Project Area. These stations are located at the James Armstrong Richardson International Airport in Winnipeg (49°55N/ 97°14'W), Steinbach (49°32'N/ 96°46'W), and Emerson (49°02'N/ 97°11W). Climate normals data, for the period of 1971-2000, for the three stations, were obtained from the EC website and are presented in Table 6.1-1.

Within the Project Area, the annual mean daily temperature varies from 3.4°C in the southern portion (Emerson Station) to 2.6°C and 2.7°C in the northern and eastern portion (Winnipeg and Steinbach Stations). Total annual precipitation averages approximately 543 mm, of which an estimated 14% falls from May to October, generally as showers and intense thundershowers. Annual snowfall ranges from 99 cm in the east to 111 cm in the north and 122 cm in the south.

Table 6.1-1: Climate Normals Data for the Project Area

Parameter	Weather Station		
	Winnipeg International Airport	Steinbach	Emerson
Annual Mean Daily Temperature (°C)[1]	2.6	2.7	3.4
Annual Mean Daily Maximum Temperature (°C)[1]	8.3	8.6	9.1
Annual Mean Daily Minimum Temperature (°C)[1]	-3.1	-3.2	-2.3
Annual Total Rainfall (mm)	415.6	440.2	440.7
Annual Total Snowfall (mm)	110.6	99.2	122.5
Total Precipitation (mm)	526.2	539.4	563.2
Average Growing Season Monthly Precipitation (mm)[2]	73.5	75.7	75.6
Average Date of Last Spring Frost (<0°C)[3]	-	May 24 to May 29	May 19 to May 24
Average Date of First Fall Frost (<0°C)[3]	-	September 11 to September 21	September 16 to September 21
Average Length of the Frost-free Period (days)[3]	-	115 to 125	115 to 125
Average Annual Accumulation of Growing Degree Days above 5°C[3]	-	1600 to 1650	1700 to 1800
Average Annual Accumulation of Growing Degree Days above 10°C[3]	-	950 to 1000	1050 to 1150

Notes:

[1] Environment Canada, 2013. Canadian Climate Normals or Averages 1971-2000. Station: Morden CDA. Accessed October 2013. URL: http://www.climate.weatheroffice.ec.gc.ca/climate_normals/index_e.html

[2] Average growing season monthly precipitation (May to August).

[3] Manitoba Agriculture, Food and Rural Initiatives. 2013. Agricultural Climate of Manitoba. Accessed August 2013. URL: http://www.gov.mb.ca/agriculture/climate/waa50s00.html

6.1.2 Geology

6.1.2.1 Bedrock Geology

The Project Area is underlain by gently southwestward dipping Paleozoic and Mesozoic sediments which form the eastern edge of the Western Canada Sedimentary Basin, and consist mainly of carbonate rocks with some clastic and argillaceous units (Betcher et al. 1995). The Red River Formation covers the northern portion of the Project Area, and is composed of limestone, dolomitic limestone and dolomite. The Amarath, Reston and Melita Formations cover most of the southern portion of the Project Area, and are composed of anhydrite gypsum, shale, dolostone; argillaceous limestone and shale; and varicolored shale, calcareous shale and limestone, respectively (Betcher et al. 1995; Klassen et al. 1970).

6.1.2.2 Surficial Geology and Landforms

Surficial geology in the Project Area consists dominantly of massive, laminated glaciolacustrine sediments (clay, silt, and minor sand) deposited from suspension in offshore, deep water of glacial Lake Agassiz. The sediments range from 1 to 20 m in thickness and are commonly scoured and homogenized by icebergs (Matile and Keller 2004). Calcareous till derived from Paleozoic dolomite and limestone, is found in the east, and occurs interspersed with proximal glaciofluvial sediments and marginal glaciolacustrine sediments. Alluvial sediments occur within existing and former river channels (Matile and Keller 2004).

The Project Area lies within the Red River Basin of the Manitoba Lowland physiographic region, an area of gentle relief found east of the Manitoba Escarpment (Betcher et al. 1995). The valley is drained by the Red River which flows south to north through the southern portion of the Project Area (north of Emerson to Morris, MB). Multiple tributaries of the Red River, such as Rat River, Marsh River and Seine River, traverse the Project Area (Section 6.2).

6.1.3 Hydrogeology

6.1.3.1 Carbonate Rock Aquifer

The main aquifer underlying the Project Area is the carbonate rock aquifer (Rutulis 1990; Rutulis 1984a, b). This aquifer is the largest freshwater aquifer in Manitoba and stretches from north of The Pas, southward through the Interlake region and continuing along the east side of the Red and Rat Rivers into Minnesota (Grasby and Betcher 2002). The groundwater becomes increasingly saline west of the Project Area. The aquifer is overlain by clay and till which act as an aquatard, limiting the movement of water from the surface to the groundwater. Based on intermediate-scale flow systems, direction of fresh groundwater flow in the carbonate aquifer is westwards (Rutulis 1984a, b; Rutulis 1990; Betcher et al. 1995). The fresh water yielded from the carbonate aquifer is adequate to abundant for household and normal farm requirements in the area.

The carbonate aquifer bears fresh water only in the area east of the Red and Rat rivers (Rutulis 1984). The carbonate aquifer provides saline groundwater in western portions of the Southern Loop transmission corridor. A major issue in the greater Winnipeg region is the potential for over-development of fresh groundwater resources that would result in the eastward migration of saline waters (Thorleifson et al. 1998).

6.1.3.2 Sand and Gravel Aquifers

Within the Project Area, the till layer which overlies the carbonate bedrock contains lenses of sand and gravel aquifers which are common in some areas and scarce in others (Betcher et al. 1995). Depth to these aquifers ranges from a few meters to more than 100 m (Rutulis 1987). Groundwater quality ranges from poor to excellent in the Project Area, and the potential for effects on groundwater resources is enhanced where surface or near-surface sand and gravel deposits are found because the deposits may contain aquifers. However, it is likely that some of the surface sand and gravel deposits or parts of them are dry, reducing the potential for interactions with the Project. Although two major-buried sand and gravel aquifers are located in the eastern portion of the Project Area, these aquifers are not traversed by the project footprint.

6.1.3.3 Flowing Well Areas

A flowing well is a well that has a static water level above the adjacent ground surface and occurs when water pressure in an aquifer causes the water level to rise above the ground surface. One large flowing well area traverses the central portion of the Project Area in a diagonal, southwest-northeast direction, spanning from west of Carlowrie to northeast of Steinbach. There are two small flowing-well areas in the southeast portion of the Project Area.

6.1.4 Landforms

The Project Area lies within the Manitoba Lowland physiographic region, an area of gentle relief found east of the Manitoba Escarpment (Betcher et al. 1995). As a result, topographic relief is generally subdued. The Red River Basin which contains the Red River Valley, a remnant of glacial Lake Agassiz, is one of the most striking landscape features in the area. The valley is drained by the Red River which flows south to north through the southern portion of the Project Area (north of Emerson to Morris, MB). Multiple tributaries of the Red River, such as Rat River, Marsh River and Seine River, traverse the Project Area (Section 6.2).

6.1.5 Soils

Soils belonging to the Vertisol and Chernozem soil orders are co-dominant in the Project Area, with minor proportions of the area covered by Brunisols, Gleysols, Luvisols, Regosols and

Organic soils. Soil materials in the Red River Valley were deposited during the time of glacial Lake Agassiz and primarily consist of deep, clayey lacustrine sediments. Soil drainage of these fine-textured sediments is dominantly poor and imperfect. Given the generally level to gently sloping landscape, the dominant soils within the Project Area are slightly to none eroded but have a high tendency for compaction, especially when wet and under heavy loads.

Land within the Project Area is dominantly well-suited for dryland crop production and rated as Class 2 and 3 for agricultural capability, with moderate to moderately-severe limitations for cropping. Annual crops grown within the Project Area include, in order of decreasing acreage, soybean, canola, wheat, oats, corn, barley, dry bean, sunflower, flax, and field pea (Manitoba Agricultural Services Corporation 2013). Agricultural capability is primarily limited by adverse soil structure or low permeability which is associated with the heavy-textured clay soils, and excess wetness attributable to the imperfect and poor soil drainage.

Irrigation suitability is an important soil interpretation, particularly for high value crops. Lands within the Project Area are rated as dominantly poor for irrigation suitability. This is mainly attributable to the dominantly heavy-textured soils with low hydraulic conductivity, and imperfect and poor drainage.

6.2 AQUATIC ENVIRONMENT

Located within the Red River Basin, the Project Area straddles the Roseau River, Riviere Salle, Red River South, Rat River and Seine River sub-watersheds, as defined by the Prairie Farm Rehabilitation Association (Map 6-2).

Spanning five watersheds (as delineated by the Manitoba Water Stewardship (MWS); Map 6-2), the Project Area drains primarily in a west to northwesterly direction through perennial, ephemeral, and intermittent natural watercourses and agricultural infrastructures (referred to as “drains”). All waters ultimately empty into Hudson Bay via the Nelson River System.

A complete list of waterbodies located within the region is provided in Appendix B, along with available detailed information regarding the existing conditions (e.g., water quality, riparian habitat, field stream assessments) of waterbodies where stream crossings may be required.

6.2.1 Surface Water Hydrology

The Project Area is contained within the Prairie and Boreal Plain ecozones (Smith et al. 1998; Map 6-1). Surface water hydrology in the Prairie Ecozone is characterized by large, turbid rivers and streams along with many smaller rivers and creeks that drain the area in a north-easterly direction through the Nelson River drainage system, ultimately draining to Hudson Bay. Many of the major watercourses in these ecozones have been modified or developed to some extent by hydro-power, irrigation, flood protection or water management (Smith et al. 1998). Perennial watercourses within the Project Area include the Red, Seine, Rat, Rousseau, Aux Marias, Marsh, and Jordan rivers, Joubert, Sarto, Mosquito and Touramond creeks, and the Coulee des Naults agricultural drain. Within the Southern Loop corridor, perennial watercourses include the La Salle, Seine and Red rivers along with the Oak Bluff agricultural drain.

The Boreal Plains ecozone is characterized as nearly level to gently rolling plains with wetlands covering between 20 and 50% of the ecozone. The principal land use activity within this ecozone is the sustainable use of forestry resources for pulpwood and sawlogs. Activities including hunting, trapping, commercial fishing operations, and tourism generated from water-oriented recreation, national and provincial parks make up the bulk of ongoing land use in the ecozone (Smith et al. 1998).

6.2.2 Water Quality

Surface waters within the Project Area generally comply with Manitoba Water Quality Standards, Objectives and Guidelines (MWQSOG; MWS 2011b) and are considered acceptable for most uses (i.e., municipal, agricultural, industrial, etc.). Appendix B provides detailed information on long-term water quality data provided by federal and provincial agencies for five waterbodies within the Project Area. Where available, information, including specific surface-water quality data from Manitoba Water Stewardship (MWS), provincial watershed advisory committees, Environment Canada, and provincial integrated planning documentation was compiled in order to provide a watershed overview of the watercourses within the Project Area. This information has provided a general overview of surface water quality in the larger waterbodies of watersheds in the RSA and is detailed in Appendix B.

In general, available data for rivers draining through southern Manitoba indicate substantial presence of nutrients as a result of regional agriculture (Bourne et al. 2002; Jones and Armstrong 2001). Waterbodies in the Project Area tend to experience total nitrogen and phosphorus concentrations that remain relatively constant (and generally exceed guidelines) with the exception of seasonal peaks during the spring freshet. Generally, reported dissolved oxygen concentrations are above the MWQSOG’s objective, but typically fall below the objective during mid-summer and mid-winter. These low oxygen levels usually result from algal blooms during summer months and under ice conditions during winter months and are not uncommon occurrences in small prairie rivers (SRRCD 2009) and do not typically impede the ability for these waterbodies to support healthy aquatic life.

Water Quality Index (WQI) rankings, which summarize large amounts of long-term water quality data into simple terms (excellent, good, fair, marginal, and poor) using parameters and calculations outlined in Appendix B, provide an overall measure of the ability of freshwater bodies to support aquatic life at selected monitoring stations. Rankings have been calculated for five rivers located in the Project Area (Environment Canada 2013, Manitoba Water Stewardship Division 2009 and 2011) (Table 6.2-1; Map 6-2).

Table 6.2-1: Water Quality Index Rankings for Waterbodies Within the Project Area

Waterbody	Water Quality Index Ranking	Data years used in Calculation	Source
LaSalle River	Marginal	2008 – 2010	Environment Canada 2013
Seine River	Ranged between Fair and Good	1990 – 2005	Manitoba Water Stewardship 2009
Rat River	Good (Fair in 1993, 1994, 1997)	1992 – 2009	Manitoba Water Stewardship 2011
Roseau River	Fair	2008 – 2010	Environment Canada 2013
Red River	Fair	2008 – 2010	Environment Canada 2013

Excellent (95-100) – Water quality never or very rarely exceeds guidelines
Good (80-94) – Water quality rarely exceeds water quality guidelines
Fair (60-79) – Water quality sometimes exceeds guidelines and possibly by a large margin
Marginal (45-59) – Water quality often exceeds guidelines and/or by a considerable margin
Poor (0-44) – Water quality usually exceeds guidelines and/or by a large margin

6.2.3 Aquatic Habitats

Much of the natural waterbodies in southern Manitoba have been altered to provide maximum land area drainage for agricultural land practices. Over the years, the Project Area landscape has been altered by the addition of a network of drainage ditches (referred to as ‘provincial drains’) and urban building which have limited much of the ecological value of viable aquatic habitats.

Waterbodies within the Project Area vary in aquatic habitat classification from simple to complex, where simple is defined as a linear channel having a trapezoidal cross-section, with a fine, uniform substrate and grassed banks or dikes; all other types are classified as complex. Where habitat classification was the same both up and downstream of a reach, less than half of streams exhibited complex riparian habitat (Milani 2013) indicating a limited presence of indictor fish species. Habitat condition evaluations, based on 12 parameters (e.g., bank stability, bank vegetative protection, frequency of riffles, available cover, etc.) generally show most streams in the Project Area are considered to be representative of poor to marginal habitat for this ecoregion (Milani 2013). Appendix B provides additional detailed information regarding waterbodies in the Project Area.

The lack of a commercial fishery, a limited sport fishery and limited information regarding an Aboriginal fishery, coupled with habitat condition evaluations, indicate that aquatic habitats within the Project Area are highly variable and of generally poor quality due to the surrounding agriculture land use practices, availability of water during the open water season and quantity and quality of water under ice cover during the winter. The implementation of appropriate mitigation measures is anticipated to limit any Project-related disturbances to aquatic habitats.

6.2.4 Aquatic Biota

Available aquatic biota information for waterbodies in the Project Area has been compiled and reported by Manitoba Water Stewardship's Integrated Watershed Management Planning Division (Manitoba Water Stewardship 2007, 2011, 2013; SRRCD 2005b and 2009; Biggins 2013a and 2013b; Milani 2013). This information along with fish species lists from published sources (e.g., Stewart and Watkinson 2004 and Milani 2013) is detailed in Appendix B.

Seventy-six species of fish potentially reside within waterbodies of the Project Area. Milani (2013) has reported that in general, fish have been observed in more than three quarters of the waterbodies within the Project Area. Approximately 80% of the waterbodies in the Project Area have been classified as Type A, B C or D habitat indicating the capacity to support fish species during the course of at least one of their life cycles (i.e., spawning, rearing, feeding, migration or over-wintering). Therefore, while habitat conditions may be considered marginal during most of the year, appropriate mitigation measures are anticipated to preclude the potential for disturbance to fish populations.

6.2.5 Species of Conservation Concern

Currently there are eight aquatic species currently considered Species of Conservation Concern (SOCC) that have historically been observed or observed within recent years in the Project Area, including:

- Chestnut lamprey (*Ichthyomyzon castaneus*)
- Shortjaw Cisco (*Coregonus zenithicus*)
- Silver chub (*Macrhybopsis storeriana*)
- Lake sturgeon (*Acipenser fulvescens*)
- Bigmouth buffalo (*Ictiobus cyprinellus*)
- Bigmouth shiner (*Notropis dorsalis*)
- Mapleleaf mussel (*Quadrula quadrula*)
- Calico crayfish (*Orconectes immunis*)

6.2.5.1 Provincially Rare Aquatic Species

Endangered species are protected provincially under the Manitoba *Endangered Species Act* (1998). The purposes of this Act are: (a) to ensure the protection and to enhance the survival of endangered and threatened species in the province; (b) to enable the reintroduction of extirpated species into the province; and (c) to designate species as endangered, threatened, extinct or extirpated species. The *Threatened, Endangered and Extirpated Species Regulation* (MR 25/98) lists plants and wildlife considered threatened, endangered and extirpated in the province. Currently, the mapleleaf mussel (*Quadrula quadrula*) has been classified as 'endangered' under this regulation.

6.2.5.2 Provincially and Federally Protected Aquatic Species

Historically, lake sturgeon was present in the Red River basin (Cleator et al. 2010 in DFO 2010). Reported to migrate up the Roseau and Pembina rivers (prior to construction of the Walhalla Dam), lake sturgeon likely spawned in the Rat, LaSalle and Seine rivers, they were virtually extirpated from southern Manitoba waterbodies by the mid-1900s (DFO 2010). This decline has primarily been attributed to over-exploitation from commercial fisheries and habitat degradation/ alteration and loss due to on-going intensive agricultural practices occurring in much of the southern limit of their range (DFO 2010). The closure of all Manitoba sturgeon fisheries and population conservation plans and stocking programs both in Canada and the US have resulted in the periodic observation or lake sturgeon in the Red River up and downstream of the Project Area (COSEWIC 2006, Stewart and Watkinson 2004). Lake sturgeon is recognized by COSEWIC (2007) as an Endangered Species and is currently under review for inclusion in Schedule 1 of the *Species at Risk Act (*2002). Although considered endangered and highly valued by First Nations, lake sturgeon is not afforded the provisions and legal protection that a Schedule 1 listing under the *SARA* (2002) would offer.

As of 2011, the bigmouth buffalo is listed as a species of Special Concern on Schedule 1 of the *SARA* (2002). As a species of Special Concern, the bigmouth buffalo is mandated to be managed, but is not legally protected under the *SARA* (2002). Records of observations of this species in the Red River exist at sites both upstream and downstream of the Project Area (Stewart and Watkinson 2004) and in the LaSalle River (Biggins pers. comm. 2013a).

Chestnut lamprey is recognized by the *SARA* (2002) as a species of Special Concern on Schedule 3. As such, the *SARA* Schedule 1 provisions and legal protection do not apply. This species has been reported in the Red River at the floodway outlet, north of St. Andrew's Dam, between Selkirk and St. Andrew's locks, and at the Selkirk Hydro Station in the 1950s. Additionally, chestnut lamprey has been recorded in the Rat and Roseau rivers (MWS 2013a). Observations of chestnut lamprey in the Red River have been recorded as recently as 2002 (COSEWIC 2011), indicating the potential for the species to occur in the Project Area.

Previously categorized as Endangered by COSEWIC in April 1985 (and reaffirmed in 2001) and listed as a Species of Special Concern on Schedule 1 of the *SARA*, the status of silver chub was re-examined and changed in May 2012 through the identification of two separate populations (the Saskatchewan – Nelson River populations in Manitoba and the Great Lakes – Upper St. Lawrence populations in Ontario). Recent sampling has suggested that this is a widespread species in Manitoba, but one which is not particularly abundant anywhere throughout its range in southern Manitoba. This, along with the lack of evidence indicating a decline in abundance or range, has led to the change in categorization of this population from Endangered to Not at Risk (COSEWIC 2012).

6.3 TERRESTRIAL ENVIRONMENT

This section provides an overview of the terrestrial environment within the Project Area. Information was gathered through a combination of desktop research, GIS-based habitat analysis, and field studies. Further details regarding field studies and habitat analysis results are contained in a Terrestrial Technical Memorandum (Appendix C).

The federal Land Cover Classification data (Government of Canada 2000) indicates that the great majority of the Project Area occurs in disturbed or altered habitats. Land cover types are predominantly cropland. Other major land cover classes include grassland/herb/pasture and developed land, while forest and wetlands/waterbodies occupy a very small portion of the Project Area (Map 6-3). With the exception of Duff Roblin Heritage Park and the St. Malo Provincial Recreation Park, no protected areas, wildlife management areas or other designated conservation lands fall within the Project Area.

6.3.1 Vegetation

The majority of the Project Area falls within the Prairie Ecozone, Lake Manitoba Plain Ecoregion, Winnipeg Ecodistrict and Emerson Ecodistrict (Map 6-1). A very small portion falls within the Boreal Plains Ecozone, Interlake Plain Ecoregion and Steinbach Ecodistrict.

Native vegetation in the Winnipeg Ecodistrict originally consisted of tall-grass prairie and other grassland communities with some wooded areas along streams and stream channels. The Emerson Ecodistrict was historically tall-grass prairie communities with some strips of forested land along waterways. Small wetlands and wet meadows are also present in both ecodistricts. The Steinbach Ecodistrict is dominated by trembling aspen stands and wetlands in the area are generally fens dominated by sedges and reed grasses. Most of the native grasslands in these areas have been lost due to cultivation of row crops, pasture land and development of drainage ditches (Smith et al. 1998). Some small remnant patches of native prairie within the area have been conserved by the Government of Manitoba, conservation organizations and private landowners.

6.3.1.1 Native Prairie

More than 99% of the tall grass prairie ecosystem has been lost in Manitoba, which is at the northern extent of its range (Samson and Knopf 1994). In 1987-88, the Manitoba Naturalist's Society (now Nature Manitoba) undertook a systematic inventory to identify remnant tall-grass prairies in their historic range in southeastern Manitoba. Tall-grass prairie once covered an area of 250,000 ha, yet only 150 ha was remaining in the late 1980s (Joyce and Morgan 1989). A study done in 2007-2008 that revisited the sites originally identified in the late 1980s found that 37% of the prairies had been converted to other land use types (Koper et al. 2009). As there is so little native tall-grass prairie left in Manitoba, conservation organizations like the Nature Conservancy of Canada, together with the province of Manitoba, have been conserving, managing and protecting remnant prairie patches. Several of the patches of remnant tall-grass prairie that were identified in surveys done in the 1980s and 1990s (Joyce and Morgan 1989, Mansell 1995; Koper et al. 2009), fall within the Project Area, however none occur within Regional Assessment Area (RAA).

6.3.2 Wildlife and Habitat

The Project Area is situated south of Winnipeg in agriculturally dominated southern Manitoba. The majority of land cover is represented by human-altered landscapes such as cropland, field margins, roads, and developed areas which provide marginal wildlife habitat. Remaining land cover types provide more productive wildlife habitat and consist of grassland, pasture land, broadleaf (deciduous) forest, shrub land, and riparian areas.

Grassland and pasture habitats providing habitat for a variety of bird and mammals species are scattered throughout the Project Area, with the largest tract of grassland paralleling the Winnipeg Floodway (Map 6-3). Riparian areas are infrequent and generally limited to river or creek crossings, and occasional wetlands providing habitat for breeding amphibians and waterfowl. Wooded riparian areas, such as those along the Red River, Rat River and Roseau River are unique features in the Project Area and provide high quality habitat with easy access to water for many wildlife species. These areas provide a mix of mature trees for nesting raptors, and immature saplings and shrubs for thermal and protective cover for ungulates and furbearers.

6.3.2.1 Invertebrates

Terrestrial invertebrates include four phyla:

- Nematoda – Round worms
- Annelida – Segmented worms
- Mollusca – Clams, snails, slugs and mussels
- Arthropoda – Insects, crustaceans, arachnids, and myriapods

Insects comprise many of the invertebrate species commonly known. The Project Area lies within the eastern edge of the Prairie Ecozone and includes the southwestern border of the Boreal Plains Ecozone (Map 6-1). Invertebrate communities in this transition between the two Ecozones are similar in that they inhabit areas historically vegetated by grasslands interspersed with stands of woodlands, with ponds and marshes common throughout the landscape.

The Prairie Ecozone has experienced declines in invertebrate and other wildlife populations due to wetland draining and cultivation of native grasslands. Prairie marshes and wetlands represent fragments of habitat that can support native plant communities and refugia for associated invertebrates. Thus, the following description of invertebrate presence in the Project Area will focus on species prevalent around wetlands and associated riparian (wooded) areas.

Invertebrate species with an aquatic larval phase (dragonflies, mayflies, midges, etc.), and those with entirely aquatic life cycles (snails, amphipods, worms, aquatic beetles) are important food sources for waterfowl (ducks, geese) and other waterbirds. Migratory birds that feed in or around wetlands are also dependent upon larval and adult life stages of these invertebrates. Additionally, invertebrates (earthworms, nematodes, isopods and other herbivores) aid in decomposition of plant and animal material and cycling of decaying organic matter into nutrients available to plants.

There are hundreds of taxonomic families and many hundreds more species of invertebrates associated with the Prairie and Boreal Plaines Ecozones (Appendix C, Table 4.2-1).

6.3.2.2 Amphibians and Reptiles

The Project Area lies mainly in the Prairies Ecozone, with the Boreal Plains Ecozone entering the southern half of the Project Area (Map 6-1). Ten amphibian species have distributions that overlap with the Project Area (CARCNET 2012). Given the presence of suitable habitat, 7 of those 10 species are considered likely to occur in the Project Area (Appendix C, Table 4.2-2). Thirteen reptiles are known to occur within the Prairie and Boreal Plains Ecozones. Of these thirteen, 6 have distributions that overlap with, and are likely to occur in, the Project Area (Table 6.2-2).

Reptiles and amphibians (herpetofauna) inhabiting the Project Area will be most plentiful around watercourses and waterbodies, especially those associated with riparian vegetation such as in woodlots, grasslands or pasturelands.

Many of the reptiles and all of the frogs expected to be present in the Project Area will occur within 1 km of a watercourse or waterbody suitable for breeding, foraging and/or overwintering.

Snakes of the Prairie and Boreal Plains Ecozones overwinter in underground dens called hibernacula. Suitable den sites are cracks or crevasses in limestone formations, abandoned cisterns and other subterranean sinkholes or caves, with access to depths below the frost line (≥ 2 m) and above the water line. These hibernacula tend to be used year after year. This habitat is generally a limiting factor within the Project Area.

6.3.2.3 Birds

Located within the Prairie and Boreal Plain ecozones, the Project Area overlaps with the ranges of over 250 bird species (Carey et al. 2003; Smith et al. 1999; Map 6-1; Appendix C, Table 4.2-3). Multi-year survey results from the North American Breeding Bird Survey Program (USGS 2013), the MB Breeding Bird Atlas (MB Breeding Bird Atlas 2013), as well as data from bird surveys conducted by Stantec (2007, 2013) have confirmed observations of over 150 of these bird species within the Project Area (Appendix C, Table 4.2-4). Species recorded during these surveys represent numerous bird groups such as waterfowl and other waterbirds (shorebirds, gulls, rails, etc.), songbirds, raptors, woodpeckers and upland game birds.

The Project Area falls within the Mississippi Flyway, a widespread and major migratory route travelled by many birds during migration to and from northern breeding grounds (Lincoln et al. 1998). Many bird species recorded in the Project Area are migratory, some of which only pass through the area during migration, while others utilize local habitats throughout the breeding season. Only a select number of bird species are resident to the area and occupy local habitats year-round.

Eighteen species of conservation concern (SOCC), as listed by the *Manitoba Endangered Species Act* (MESA 1990), the federal Species at Risk Act (SARA 2002) and/or classified by the Committee on the Status of Endangered Species in Canada (COSEWIC 2013), have the potential to occur within the Project Area. These species are further discussed in Section 6.3.3.2.3.

No Important Bird Areas (IBA) are present within the Project Area (IBA 2013). The nearest IBA is located within Grant's Lake Wildlife Management Area (WMA), approximately 30 km northeast of the La Verendrye station.

6.3.2.3.1 Waterfowl and other Waterbirds

Wetlands and other waterbodies are infrequent within the Project Area. Riparian habitats are generally limited to river or creek crossings and as such, breeding and nesting habitat for waterfowl and other waterbirds in Project Area is limited. Of the 18 bird species of conservation concern (listed by MESA [1990], SARA [2002] and/or classified by COSEWIC [2013]), three are waterbirds: yellow rail, horned grebe and least bittern. Occurrences and/or potential for these species to occur in the Project Area are further discussed in Section 6.3.3.

The largest waterbodies in vicinity of the Project Area includes a series of wetlands at Fort Whyte Alive, located approximately 9 km east of the La Verendrye station (Map 6-3). Several waterbird species are known to breed at these wetlands such as Canada goose, mallard, hooded merganser, spotted sandpiper, killdeer, Virginia rail and American coot (Fort Whyte 2013). The wetlands at Fort Whyte are also a waterfowl staging site frequented by Canada geese and other waterfowl during the migration seasons. Fort Whyte is not located within the Project Area, but many waterfowl and other waterbird species utilizing these wetlands for staging purposes during migration likely pass through the Project Area when traveling to neighboring fields to forage.

The Rat River Swamp, located along the southeastern boundary of the Project Area (Map 6-4), is the closest named waterbody to the Project that provides important breeding habitat for some waterbirds. This wetland is part of the Rat River WMA and portions of it are protected under Manitoba's Protected Area network (MBPAI 2013; Map 6-4). Portions of this swamp have been identified by the federal government as critical habitat for the least bittern, a provincially and federally listed 'at risk' species (Environment Canada 2011).

According to breeding bird survey data (USGS 2013; Manitoba Breeding Bird Atlas 2013; Stantec 2007, 2013), over 40 species of waterbirds and waterfowl have been recorded within the Project Area (Appendix C, Table 4.2-3). Waterbirds observed regularly in the Project Area include shorebirds such as killdeer, Wilson's snipe, upland sandpiper, and spotted sandpiper. Rails, including American coot and sora have also been recorded. Killdeer and upland sandpipers are shorebirds that will occupy drier habitats such as road allowances and grazed pastures with killdeer also preferring exposed, disturbed habitats for nesting (i.e., gravel pits, driveways, golf courses, lawns; Carey et. al 2003). Wilson's snipe, spotted sandpiper and rails generally prefer wet grassy riparian edge habitats along riverbanks, ponds and occasionally roadside ditches.

Multi-year breeding bird survey data (USGS 2013; MB Breeding Bird Atlas 2013) identify Canada goose and mallard as the waterfowl species most commonly identified in the Project Area (Appendix C, Table 4.2-3). Blue-winged teal, wood duck and northern shoveler are additional species regularly observed in the local area. Vegetated riparian buffers along the rivers, creeks and drains in the Project Area, as well as upland grassland habitats along the edges of the Winnipeg Floodway, provide cover for nesting waterfowl. Wooded riparian edges with large trees provide additional nesting habitat for wood ducks which are cavity nesting species.

Although cropland provides marginal breeding habitat for most birds, stubble and harvested fields throughout the Project Area become feeding and staging areas for migratory waterfowl during spring and fall. Large flocks of waterfowl, particularly Canada geese, frequent the Project Area during the migration periods. The Red River, crossed twice by the proposed Project, is frequently used as a roosting site by Canada geese during migration as birds travel to and from feeding areas in adjacent fields.

6.3.2.3.2 Raptors

Over 15 raptor species have been documented in breeding bird survey data available for the Project Area (USGS 2013, MB Breeding Bird Atlas 2013; Stantec 2007, 2013; Appendix C, Table 4.2-3). Of these species, the most commonly recorded include red-tailed hawk, American kestrel, and northern harrier; other species also include, but are not limited to, great-horned owl, merlin and Cooper's hawk. Of the 18 bird species of conservation concern (listed by MESA

[1990], SARA [2002] and/or classified by COSEWIC [2013]), three are raptors: short-eared owl, ferruginous hawk and peregrine falcon. Occurrences and/or potential for these species to occur in the Project Area are further discussed in Section 6.3.3.2.3.

Many raptor species utilizing habitats within the Project Area are tree nesting species but often forage in the open surrounding areas. As open, agricultural land cover dominates the area, nesting sites are most likely chosen within treed bluffs, shelterbelts and mature trees along some of the major watercourses such as the Red River, Rat River and Seine River. Northern harrier is one of the few ground nesting raptors common to the Project Area and prefers open wetlands, lightly grazed pastures, grasslands and occasionally cropland as potential nesting habitat (Smith et al. 2011). Short-eared owl is another raptor species with potential to occur in the Project Area that has preference for grassland habitats; this species is further discussed in Section 6.3.3.2.3.

Raptors are known to use topographic features as navigational aids during migration. In southern Manitoba, the Red River is one such feature and early spring migration of raptors is annually monitored along the river in St. Adolphe (Hawk Count 2013), approximately 10 km west of the Project Area. Numerous species, including red-tailed hawk, sharp-shinned hawk, broad-winged hawk and bald eagle have been observed following the river corridor during migration (Hawkcount 2013). In 2013, monitoring observations at this site between March and May recorded over 3000 raptors migrating along the Red River (Hawk Count 2013).

6.3.2.3.3 Upland Game Birds

Of the five potential species of upland game birds with distribution ranges which overlap with the Project Area, four species have been recorded in existing bird survey data: grey partridge, ruffed grouse, sharp-tailed grouse and ring-necked pheasant (USGS 2013, MB Breeding Bird Atlas 2013; Appendix C, Table 4.2-3). The Project Area is located on the eastern edge of the distribution range of ring-necked pheasants and therefore this species is generally uncommon in the local area. All upland game bird species that could occur within the Project Area are non-migratory and occupy local habitats year round. No upland game bird species are listed as species of conservation concern by MESA (1990), SARA (2002) and/or classified by COSEWIC (2013).

Grey partridge frequent agricultural cropland and grassland habitats, while ruffed grouse are more common among deciduous forests (Carroll 1993; Peterson 2002). Sharp-tailed grouse prefer open grassland and pasture habitats during breeding, as well as areas with deciduous tree and shrub cover for brood-rearing, foraging and overwintering (Baydack 1998; Connelly 1998).

During their breeding season of April to May, sharp-tailed grouse are known to gather in groups during early morning hours and perform courtship displays on preferred breeding grounds called ‘leks’. Leks generally occur in open upland areas, such as pasture or grassland habitats, that offer high visibility of their surrounding landscape (Baydack 1988). Grouse will annually return to the same lek for breeding purposes in spring and possibly again in late fall when males return to establish territories (Baydack and Hein 1987). In agriculturally dominated landscapes, leks or suitable lekking habitat is frequently disturbed or destroyed by land use practices such as cultivation of pasture.

6.3.2.3.4 Songbirds and Other Birds

Songbirds represent the majority of bird species potentially utilizing habitats within the Project Area. Of the over 130 passerine species that may potentially occur in the area (Appendix C, Table 4.2-3), close to 100 have been recorded in existing bird survey data (USGS 2013; Manitoba Breeding Bird Atlas 2013; Stantec 2007, 2013). Other birds with potential to occur in the Project Area that have not yet been discussed include species from groups such as woodpeckers, kingfishers, and pigeons. These bird species also occupy a diverse array of habitats.

Most songbird species are migratory and occupy habitats within the Project Area during the breeding season (April to August), with peak breeding months being May through July for most species. Some bird species, such as black-capped chickadees, blue jays, American crow and nuthatches, are resident species and will remain in the local area year round, particularly in areas where wooded cover is present (woodlots, farmyards, riparian areas).

Human-altered landscapes that dominate the Project Area, such as cropland, developed and exposed areas, will typically support generalist bird species such as horned lark, clay-colored sparrow, American crow, rock pigeon and a variety of blackbird species. Buildings and other structures associated with developed areas may also provide nesting habitats for species such as barn swallow and chimney swift. Grassland, forest and shrub habitats typically support a greater diversity and abundance of birds. Grassland and rangeland, located within the assessment areas support grassland songbird specialists, such as bobolink and vesper sparrow. Forest and shrub habitats, occurring only in woodlots and along the banks of several rivers and creeks (i.e., Red River, Roseau River, Rat River) provide habitat for a variety of species such as least flycatcher, Tennessee warbler, common yellowthroat, red-headed woodpecker and hairy woodpecker.

Of the 18 bird species of conservation concern (listed by MESA [1990], SARA [2002] and/or classified by COSEWIC [2013]) that have distribution ranges which overlap with the Project Area, eight are songbirds or other birds (birds not included in the bird groups discussed previously): these are chimney swift, common nighthawk, eastern wood-peewee, golden-winged warbler, loggerhead shrike, olive-sided flycatcher, red-headed woodpecker and whip-poor-will. Documented occurrences and/or potential for these species to occur in the Project Area further discussed in Section 6.3.3.2.3.

6.3.2.4 Mammals

Approximately 95% of the Prairie Ecozone has been converted to agriculture, while the Boreal Plains Ecozone has been affected by logging and forest clearing to make way for other human activities (Smith et al. 1999). The widespread alteration of the natural habitat has resulted in diminished populations and ranges of many animals.

Within the boundaries of the Project Area, the land is composed of 58.55% annual cropland, and 4.72% perennial crop and pasture (Map 6-3). Water and wetlands, collectively, comprise less than 1% of the Project Area, 6% of the land is treed. The remaining land that is not agriculture, treed or water-covered is largely grassland or other low vegetation.

The only large carnivore in the Prairie Ecozone is the black bear, while wolf and lynx can be found in the Boreal Plains Ecozone. The most common large herbivores in both ecozones is now the invasive white-tailed deer, while elk might be found where large patches of deciduous forest occur, but would be considered rare in the Project Area. Historically woodland caribou and, more recently, moose may have occurred in the Project Area. Neither has been recorded in the area for many years. As well, pronghorn antelope, mule deer and bison were also common in both ecozones.

Common smaller carnivores in both the Boreal Plains and Prairie Ecozones include the coyote, bobcat, least weasel, river otter, badger, striped skunk, red fox, marten, and fisher. American badger is listed as being of special concern, but does not yet have a schedule (SARA 2013).

There are many rodents that are found in both ecozones, such as the northern pocket gopher, muskrat, beaver, woodchuck, Richardson's ground squirrel, thirteen-lined ground squirrel, Franklin's ground squirrel, least chipmunk, porcupine, eastern cottontail, and snowshoe hare. Olive-backed pocket mouse, Ord's kangaroo rat, and white-footed mouse are inhabitants of the Prairie Ecozone.

There are six species of insectivorous bats found in both the Prairie and Boreal Plains Ecozones, all of which have ranges that include the Project Area (Banfield 1974; Bat Conservation International [BCI] 2006). Migratory species include the hoary bat, silver-haired bat, and eastern red bat, while the little brown bat, big brown bat and northern long-eared myotis are considered residents. Knowledge about the specific migratory routes through southern Manitoba is generally lacking (Barclay pers comm. 2006). No species of bat that occur in Manitoba are currently listed as being at risk under the Species at Risk Act (SARA 2013), however little brown bat and northern long-eared bat are both recommended for listing as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2013).

Within both ecozones, cultivated farmland provides some habitat for certain species such as rodents, and forage habitat for other species such as bats, deer and other ungulates. However, carnivores and fur-bearers would be limited to more ecologically diverse areas such as woodlots, wetlands and pastureland. Even small woodlots may contain enough species diversity to support several species (Swanson et al. 2005). These small areas of undeveloped land occur in patches throughout the Project Area, especially where agricultural production is marginal, such as along rivers, streams and drainage swales. The easternmost portions of the Project Area contain the highest concentrations of undeveloped land, including woodlots, pastureland and wetlands.

6.3.3 Species of Conservation Concern

A request was made to the Manitoba Conservation Data Centre (MBCDC) to provide a list of the Species of Conservation Concern (SOCC) that have been confirmed to occur within the Project Area. MBCDC provides this list of species as well as their ranking according to the Subnational Ranking System explained in Table 6.3-1. The occurrence list also indicates each species designation with regard to the *Manitoba Endangered Species Act* (MESA), The Committee on the Status of Endangered Wildlife in Canada (COSWEIC) and the federal *Species at Risk Act* (SARA).

Table 6.3-1: Manitoba Conservation Data Centre – Subnational Ranks

S1	Very rare throughout its range or in the province (5 or fewer occurrences, or very few remaining individuals). May be especially vulnerable to extirpation.
S2	Rare throughout its range or in the province (6 to 20 occurrences). May be vulnerable to extirpation.
S3	Uncommon throughout its range or in the province (21 to 100 occurrences).
S4	Widespread, abundant, and apparently secure throughout its range or in the province, with many occurrences, but the element is of long-term concern (> 100 occurrences).
S5	Demonstrably widespread, abundant, and secure throughout its range or in the province, and essentially impossible to eradicate under present conditions.
SU	Possibly in peril, but status uncertain; more information needed.
SH	Historically known; may be rediscovered.
SX	Believed to be extinct; historical records only, continue search.
SNR	A species not ranked. A rank has not yet assigned or the species has not been evaluated.
SNA	A conservation status rank is not applicable to the element.
?	Inexact or uncertain; for numeric ranks, denotes inexactness.

6.3.3.1 Vegetation

A number of plant species that are assessed by COSEWIC and/or listed by the SARA or MESA may be found in the Project Area (Appendix C, Table 7.1-1). MBCDC lists plant species of conservation concern and provides a status rank. All plant species of conservation concern that are known to occur or may occur in the Project Area were identified through information available from MBCDC (Table 6.3-2 and Appendix C, Table 2.3-1). Most of the plants of conservation concern are those that occur in native prairie or open thickets adjacent to forested areas.

No ecosystems are considered rare or are assigned a provincial rank in the Lake Manitoba Plain Ecoregion, however, in the adjacent Interlake Plain Ecoregion, there are several communities that are of conservation concern (Appendix C, Table 2.3-2). As the Project is in close proximity to the Interlake Plain Ecoregion, there is a possibility that these communities could occur in the Project Area. However, given the extensive studies that have occurred on the tall-grass prairie and associated plant communities in south-central Manitoba, it is likely they would have been detected, if they were present.

Table 6.3-2: Plant Species of Conservation Concern Recorded in the Regional Assessment Area

Species of Conservation Concern		Conservation Status				General Preferred Habitat	Confirmed Observation Project Area
Scientific Name	**Common Name**	**MESA**	**SARA**	**COSEWIC**	**MBCDC Rank**		
Agalinis tenuifolia	Narrow-leaved Gerardia	Not listed	Not listed	Not listed	S2S3	Moist southern boreal forest	MBCDC
Agrimonia gryposepala	Common Agrimony	Not listed	Not listed	Not listed	S1S2	Open woods and thickets	MBCDC
Amorpha fruticosa	False Indigo	Not listed	Not listed	Not listed	S1S2	Along riverbanks and Parkland	MBCDC
Asclepias verticillata	Whorled Milkweed	Not listed	Not listed	Not listed	S3	Dry Prairie and Parkland	MBCDC
Astragalus neglectus	Milkvetch	Not listed	Not listed	Not listed	S1	Open habitats	MBCDC
Boltonia asteroides var. recognita	White Boltonia	Not listed	Not listed	Not listed	S2S3	Moist parklands and boreal forest	MBCDC
Cardamine bulbosa	Spring Cress	Not listed	Not listed	Not listed	SH	Moist southern boreal forest	MBCDC
Carex cristatella	Crested Sedge	Not listed	Not listed	Not listed	S2	Moist woodlands, sedge meadows, wet prairie	MBCDC
Carex emoryi	Emory's Sedge	Not listed	Not listed	Not listed	S2?	Wet areas near rivers and lakes	MBCDC
Carex hallii	Hall's Sedge	Not listed	Not listed	Not listed	S3	Saline prairies	MBCDC
Carex tribuloides	Prickly Sedge	Not listed	Not listed	Not listed	SNA	Wet woodlands and prairies	MBCDC
Corispermum americanum var. americanum	American Bugseed	Not listed	Not listed	Not listed	S2S3	Prairies and disturbed roadsides	MBCDC

Table 6.3-2: Plant Species of Conservation Concern Recorded in the Regional Assessment Area

Species of Conservation Concern		Conservation Status				General Preferred Habitat	Confirmed Observation Project Area
Scientific Name	**Common Name**	**MESA**	**SARA**	**COSEWIC**	**MBCDC Rank**		
Cuscuta pentagona var. pentagona	Dodder	Not listed	Not listed	Not listed	SU	Moist prairie and parkland areas	MBCDC
Cyperus erythrorhizos	Red-root Flatsedge	Not listed	Not listed	Not listed	S1	Wet rivers/ditches/wetlands	MBCDC
Cypripedium candidum	Small White Lady's-slipper	Endangered	Endangered	Endangered	S2	Undisturbed wooded grasslands	MBCDC
Desmodium canadense	Beggar's-lice	Not listed	Not listed	Not listed	S2	Native prairies and wet meadows	MBCDC
Hypoxis hirsute	Yellow Stargrass	Not listed	Not listed	Not listed	S4	Prairies and thickets	MBCDC
Lactuca floridana	Woodland Lettuce	Not listed	Not listed	Not listed	SH	Edge of woods in boreal	MBCDC
Lysimachia quadriflora	Whorled Loosestrife	Not listed	Not listed	Not listed	S2	Open woods and thickets	MBCDC
Nassella viridula	Green Needle Grass	Not listed	Not listed	Not listed	S3	Open woods and thickets	MBCDC
Penthorum sedoides	Ditch-stonecrop	Not listed	Not listed	Not listed	S1S2	Shores and ditches of southern boreal forest	MBCDC
Polygala verticillata var. isocycla	Whorled Milkwort	Not listed	Not listed	Not listed	S2	Prairie and forest edge	MBCDC
Solidago riddellii	Riddell's Goldenrod	Threatened	Special Concern	Special Concern	S2	Native prairie and shrubby fen	MBCDC
Sporobolus neglectus	Annual Dropseed	Not listed	Not listed	Not listed	S3?	Dry prairie, woodland or roadsides	MBCDC

Table 6.3-2: Plant Species of Conservation Concern Recorded in the Regional Assessment Area

Species of Conservation Concern		Conservation Status				General Preferred Habitat	Confirmed Observation Project Area
Scientific Name	**Common Name**	**MESA**	**SARA**	**COSEWIC**	**MBCDC Rank**		
Symphyotrichum sericeum	Western Silvery Aster	Threatened	Threatened	Threatened	S2S3	Dry prairie, openings in aspen/oak woodlands	MBCDC
Vernonia fasciculata ssp. corymbosa	Western Ironweed	Endangered	Not listed	Not listed	S1	Sloughs and river valleys in parkland or boreal forest	MBCDC
Veronicastrum virginicum	Culver's-root	Threatened	Not listed	Not listed	S1	Edge of shrubs and aspen or oak woods	MBCDC
Viola labradorica	Dog Violet	Not listed	Not listed	Not listed	S3?	Meadows and damp woods	MBCDC

Source: Manitoba Conservation Data Centre

*Manitoba Conservation Data Centre – for definitions of Subnational Ranks for Wildlife Species, see Table 6.3-2

6.3.3.2 Wildlife

6.3.3.2.1 Invertebrates

MBCDC lists six invertebrate species of conservation concern and provides a status rank (Table 6.3-2). All invertebrate species of conservation concern that are known to occur or may occur in the Project Area were identified through information available from MBCDC (Table 6.3-3).

Table 6.3-3: Invertebrate Species of Conservation Concern Recorded within the Project Area

Species of Conservation Concern			Conservation Status			
Scientific Name	**Common Name**	**Name Category**	**S Rank***	**MESA**	**SARA**	**COSEWIC**
Lasmigona costata	Flutedshell	Invertebrate Animal	SNR	No Status	No Status	No Status
Ligumia recta	Black Sandshell	Invertebrate Animal	SNR	No Status	No Status	No Status
Orconectes immunis	Calico Crayfish	Invertebrate Animal	SNR	No Status	No Status	No Status
Strophitus undulatus	Creeper	Invertebrate Animal	SNR	No Status	No Status	No Status
Quadrula quadrula	Mapleleaf Mussel	Invertebrate Animal	S2	Endangered	Endangered	Endangered

Source: Manitoba Conservation Data Centre – *for definitions of Subnational Ranks for Wildlife Species see Table 6.3-2

6.3.3.2.2 Amphibians and Reptiles

MBCDC lists one amphibian and two reptile species of conservation concern within the Project Area and provides a status rank (Table 6.3-2). All amphibian and reptile species of conservation concern that are known to occur or may occur in the Project Area were identified through information available from MBCDC (Table 6.3-4). Information on habitat requirements for species of conservation concern is detailed in Appendix C, Section 2.3.2.2).

Table 6.3-4: Amphibian and Reptile Species of Conservation Concern Recorded within the Project Area

Species of Conservation Concern			Conservation Status			
Scientific Name	**Common Name**	**Name Category**	**S Rank***	**MESA**	**SARA**	**COSEWIC**
Chelydra serpentina serpentina	Common Snapping Turtle	Vertebrate Animal	S3	No Status	Special Concern	Special Concern
Lithobates pipiens	Northern Leopard Frog	Vertebrate Animal	S4	No Status	Special Concern	Special Concern
Liochlorophis vernalis	Smooth Green Snake	Vertebrate Animal	S3S4	No Status	No Status	No Status

Source: Manitoba Conservation Data Centre – *for definitions of Subnational Ranks for Wildlife Species see Table 6.3-2

6.3.3.2.3 Birds

Eighteen SOCC, as listed by MESA (1990), SARA (2002) and/or classified by COSEWIC (2013), have the potential to occur within the Project Area (Appendix C, Table 4.3-3). Records from Manitoba Conservation Data Centre (2013), as well as existing breeding bird survey data (North American Breeding Bird Survey Program 2013; Manitoba Breeding Bird Atlas 2013; Stantec 2007, 2013) have documented 16 of these species in the Project Area (Table 6.3-5). Details on characteristics and habitat preferences of all species at risk with potential to occur in the Project Area are further discussed in Appendix C, Section 2.3.2.3.

Table 6.3-5: Bird Species of Conservation Concern Recorded in the Project Area and/or Regional Assessment Area

Species of Conservation Concern		Conservation Status				MBCDC Records in the Project Area	Confirmed Observation in Project Area**
Common Name	**Scientific Name**	**MESA**	**SARA**	**COSEWIC**	**S Rank***		
Bank Swallow	*Riparia riparia*	No Status	No Status	Threatened	S4B		✓
Barn Swallow	*Hirundo rustica*	No Status	No Status	Threatened	S4B		✓
Bobolink	*Dolichonyx oryzivorus*	No Status	No Status	Threatened	S4B	✓	✓
Canada Warbler	*Cardellina canadensis*	Endangered	Threatened	Threatened	S4B	✓	✓
Chimney Swift	*Chaetura pelagica*	Threatened	Threatened	Threatened	S2B	✓	✓
Common Nighthawk	*Chordeiles minor*	Threatened	Threatened	Threatened	S3B		✓
Eastern Wood-peewee	*Contopus virens*	No Status	No Status	Special Concern	S4S5B		✓
Ferruginous Hawk	*Buteo regalis*	Endangered	Threatened	Threatened	S2		✓
Golden-winged Warbler	*Vermivora chrysoptera*	Threatened	Threatened	Threatened	S3B		✓
Least Bittern	*Ixobrychus exilis*	Endangered	Threatened	Threatened	S2S3B		✓
Loggerhead Shrike	*Lanius ludovicianus*	Endangered	Endangered	Endangered	S1B	✓	
Olive-sided Flycatcher	*Contopus cooperi*	No Status	Threatened	Threatened	S3S4B		✓
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Threatened	Threatened	Threatened	S2B	✓	✓
Short-eared Owl	*Asio flammeus*	Threatened	Special Concern	Special Concern	S2S3B		✓
Whip-poor-will	*Antrostomus vociferus*	Threatened	Threatened	Threatened	S3B		✓
Yellow Rail	*Coturnicops noveboracensis*	No Status	Special Concern	Special Concern	S3S4B		✓

6.3.3.2.4 Mammals

American badger, assessed by COSEWIC as being of Special Concern, but not yet listed by SARA or MESA may be found in the Project Area.

MBCDC lists mammal species of conservation concern and provides a status rank. All mammal species of conservation concern that are known to occur in the Project Area were identified through information available from MBCDC. The plains pocket gopher (*Geomys bursarius*), while not listed by MESA, SARA or COSEWIC, is ranked as S3 (uncommon throughout its range) by MBCDC. There are not yet any recorded observations of American Badger within the Project Area. Detail on characteristics and habitat preferences of these species are further discussed in Appendix C, Section 2.3.2.4.

6.4 SOCIO-ECONOMIC ENVIRONMENT

6.4.1 Land Use

This section provides an overview of land and resource use for VCs within the Regional Study Area (RSA). The RSA for the socio-economic environment consists of those municipal jurisdictions within which the Project is proposed to be located (Map 6-5), extending along the Southern Loop corridor from La Verendrye Station to St. Vital Station (the RM of Macdonald to the city of Winnipeg) and from St. Vital Station to Letellier Station (the city of Winnipeg to the RM of Montcalm). The following topics are addressed in the sections here:

- Agricultural land use
- Non-agricultural land use (recreational land use, designated protected areas and conservation lands, resource use, including domestic use)
- Traditional land and resource use
- Property and residential development
- Infrastructure and services
- Population, economy and communities

6.4.1.1 Agricultural Land Use

Concerns regarding the effects of the Project on agricultural land use were identified during the PEP. Potential issues were primarily related to construction-related activities and the eventual presence of transmission lines overlapping physically with existing uses. Comments focused on the potential effects on agricultural operations.

6.4.1.1.1 Regional Study Area

The RSA largely falls under Division No. 2 of Census Agricultural Region (CAR) 9 with small portions in the northwest and southwest under CAR 7 (Division No. 10) and CAR 8 (Division No. 3), respectively (Statistics Canada 2011).

According to the 2011 Census, CAR 9 had 1,868 farms of which 1,264 were in Division 2 (RMs of Franklin, De Salaberry, Hanover, La Broquerie, Ste. Anne, Tache, and Ritchot). Census Agricultural Region 8 had 1,379 farms of which 88 were in Division No. 3 (RM of Montcalm) while CAR 7 had 337 farms of which 214 were in the RM of Macdonald. The total farm areas in Division No. 2, Division No. 10 and Division No. 3 decreased by 2.7%, 1%, and 4%, respectively, between 2006 and 2011. See Sections 6.4.1.1.4 and 6.4.1.1.5 for the occurrence and distribution of annual versus annual cropping as well as livestock operations in the RSA.

6.4.1.1.2 Agricultural Capability within the Study Area

Agricultural land capability is a function of climatic, topographic and soil conditions for any given parcel of land. Assignment of soils to agricultural capability classes provides insight into the ability of the soils to support cropping and the extent of limitations affecting the soils. The definitions of agricultural capability classes are given in Table 6.4-1.

Table 6.4-1: Agricultural Capability Classes

Agricultural Capability Class	Degree of Limitation
1	No significant limitations for production of the specified crops.
2	Slight limitations that might restrict the growth of the specified crops or need modified management practices.
3	Moderate limitations that restrict the growth of the specified crops or need special management practices.
4	Severe limitations that restrict the growth of the specified crops or need special management practices, or both. This class is marginal for sustained production of the specified crops.
5	Very severe limitations for sustained production of the specified crops. Annual cultivation using common cropping practices is not recommended.
6	Extremely severe limitations for sustained production of the specified crops. Annual cultivation is not recommended, even occasionally.
7	Not suitable for production of the specified crops.

Source: AAFC (1995)

The agricultural capability classes for soils within the RSA are reported in several soil survey reports (Ehrlich et al. 1953; Hopkins 1985; Hopkins et al. 1993; MAFRD 2011; Michalyna et al. 1975; and Podolsky 1984).

Soils within the RSA are rated as Class 1 (1.6%), Class 2 (46.7%), Class 3 (41.4%), Class 4 (2.2%), Class 5 (5.7%), and Class 6 (0.9%) (Table 6.4-2). Soil capability decreases in an eastern direction in the RSA, with increasing proportions of less productive Class 4, Class 5 and Class 6 soils in the eastern portions of the RMs of Hanover, Franklin, and Tache (Map 6-6). While the eastern portion of the RSA contains soils which are highly productive (Agricultural Capability Classes 1-3), in the east, there is a broader range of agricultural capability with soils belonging to Agricultural Capability Classes 1 through 6. The eastern portion of the RSA (RMs of Tache and Hanover) also contains organic soils which are primarily associated with low-lying landscapes and wetlands. The primary limitations for agricultural capability within the RSA are excess water (subclass W) which affects 75% of the area, and moisture deficiency (subclass M) which affects 13% of the area. Other limitations, each affecting <5% of the area, are undesirable structure and/or permeability (subclass D), surface stoniness (subclass P), inundation (subclass I), salinity (subclass N), and topography (subclass T).

Table 6.4-2: Agricultural Capability in the Regional Study Area

Agricultural Capability Class	Areal Extent (ha)	Proportional Extent (%)
1	8,211	1.6
2	234,082	46.7
3	207,543	41.4
4	11,157	2.2
5	28,703	5.7
6	4,318	0.9
7	4	<0.1
Organic	3,686	0.7
[1]Not applicable	3,128	0.6
[2]Total	500,832	100

Notes:

Not applicable = Urban land

Totals may not add up due to rounding

6.4.1.1.3 Annual and Perennial Cropping

The RSA is largely comprised of land under annual crop production, according to existing land cover classification (EOSD-NRCAN 2001). However, the southeastern portion of the RSA, which has appreciable occurrences of less productive lands, is characterized by more variable agricultural land cover classes including range and grassland, and perennial cropland and pasture (see Map 6-3). Approximately 61% of the RSA is identified as annual cropland, while approximately16% of the RSA is identified as range and grassland, and 4% as perennial cropland and pasture. The remainder of the RSA is covered by non-agricultural land cover classes.

Given the dominant occurrence of highly productive lands within the RSA, particularly in the western and northwestern portions of the RSA, the reported crop-insured acreages are primarily under annual cropping, with the top cropping acreages from 2011 to 2013[1] associated with relatively high-value annual crops, namely soybeans and canola. The top ten crops by acreage from 2011 to 2013 represented over 98% of reported crop acreages (MASC 2014), and consisted predominantly of annual crops – soybeans, canola, red spring wheat, winter wheat, grain corn, oats and barley (Figure 6.4-1). Perennial crops for hay production rounded out the top ten crops by acreage, and included alfalfa, alfalfa/grass mix and grasses.

When production values are considered, a similar pattern is observed, with the top ten crops by production value within the RSA from 2011 to 2013 being the same as those identified by acreages, with the exception of pinto beans and grasses in the top ten on a production value basis (MASC 2014). The estimated production values of the top two crops within the RSA, canola and soybeans, were over $120m, while the next five annual crops had production values ranging from approximately $80m to approximately $11m (Figure 6.4-2). The three crops rounding out the top ten include pinto beans, alfalfa and alfalfa/grass mix.

Estimated production values in dollars per acre, based on total production acreages and estimated production values from 2011 to 2013, are presented in Figure 6.4-2 and provide a relative measure of production value by unit area for each crop. These values ranged from $670/ac for pinto beans to $114/ac for alfalfa/grass mix.

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[1] The period of 2011 to 2013 was selected to represent a typical three-year crop rotation cycle, with crop data from the 2013 growing season being the most recent available.

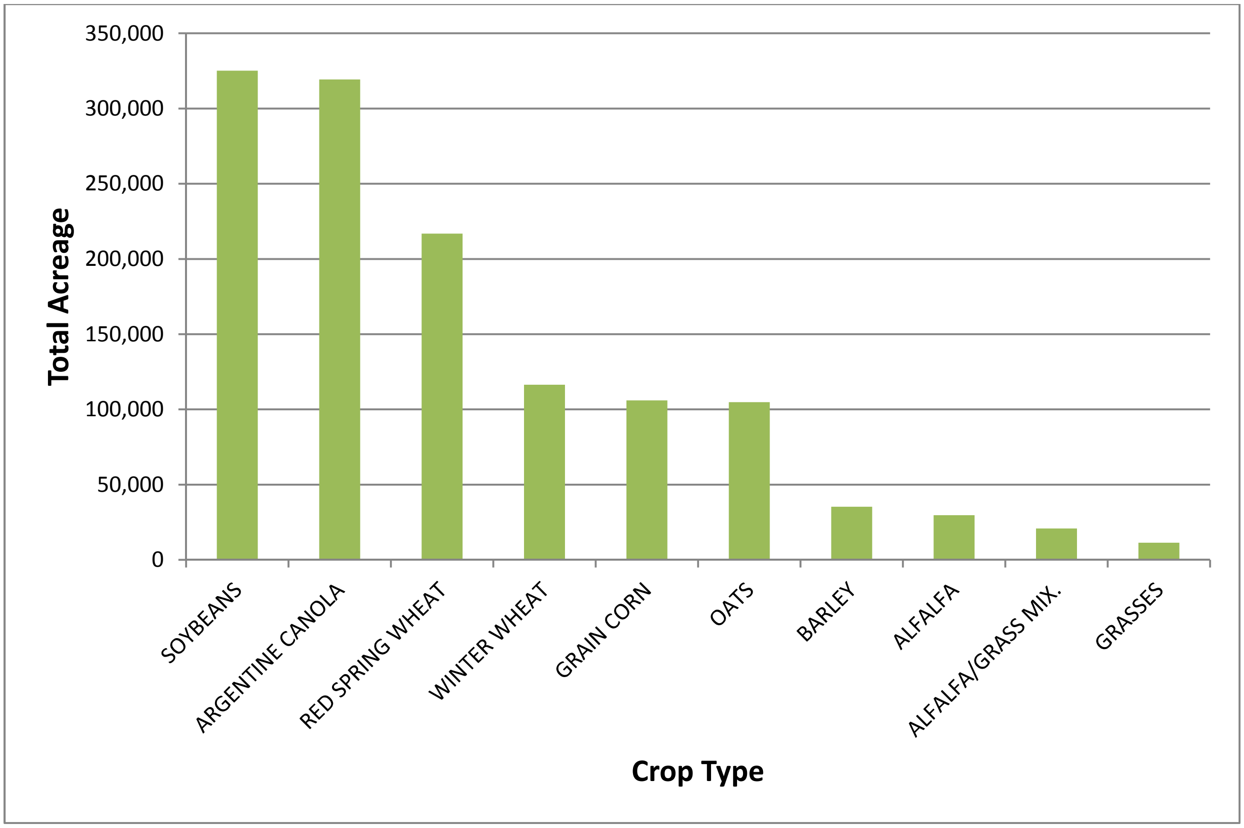

Figure 6.4-1: **Total Reported Acreages for Crops Grown Within the Regional Study Area from 2011 to 2013[2] (MASC 2014)**

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[2] Includes acreages associated with the top ten crops by cumulative acres between 2011 and 2013.

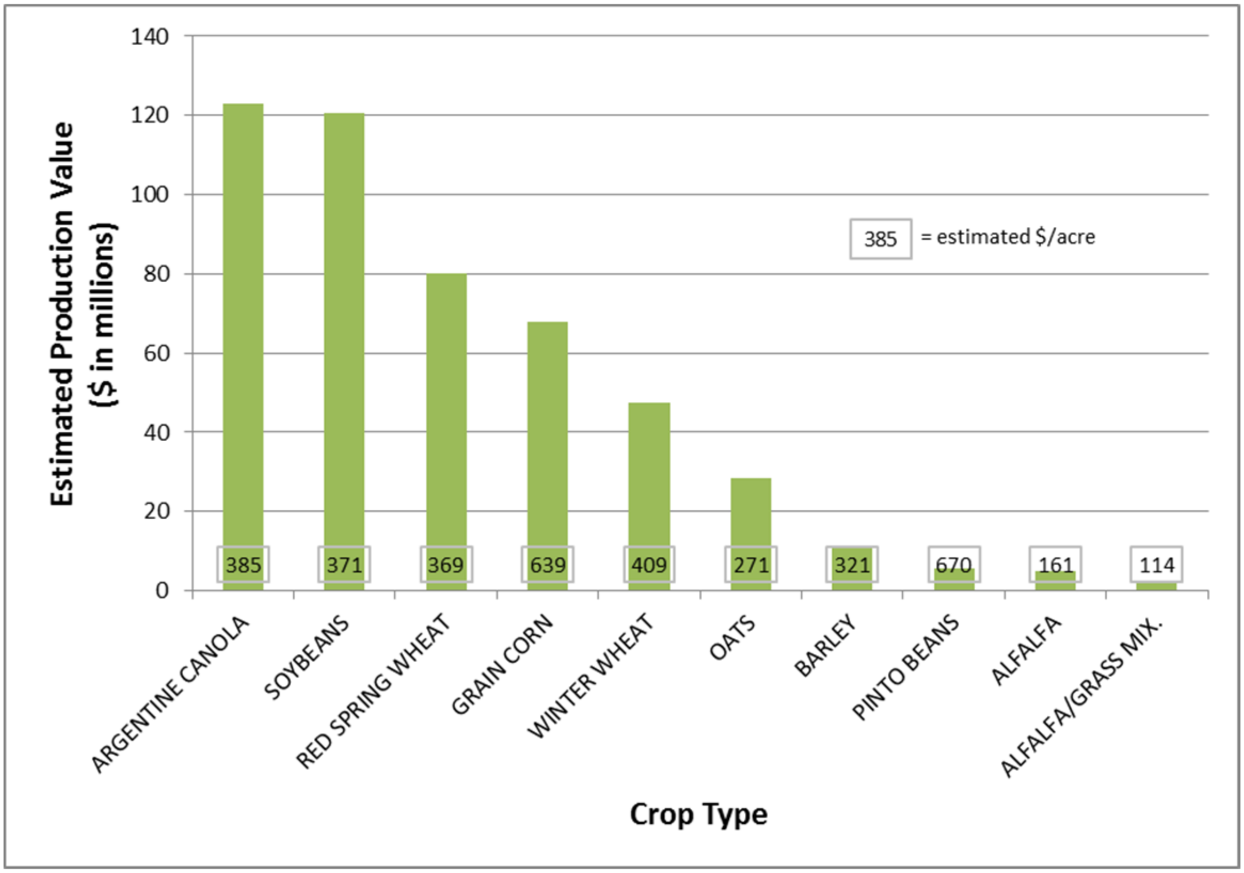

Figure 6.4-2: **Estimated Crop Production Value by Crop Type Within the Regional Study Area from 2011 to 2013[3] (MASC 2014)**

6.4.1.1.4 Livestock Operations

The RSA contains hog, dairy, beef, and poultry livestock operations. Map 6-7 shows the known locations of hog, dairy and broiler chicken and hatching egg operations. The Pansy Community Pasture, which is located in the southeast part of the RSA, provides grazing and breeding opportunities for agricultural producers in the area.

The RM of Hanover contains the most hog operations within the RSA, with fewer hog operations found in the RMs of Tache, Ritchot, Macdonald, De Salaberry, Franklin and Montcalm. Associated with hog operations is the land application of liquid manure to agricultural fields which in some cases might involve the use of surface drag lines or permanently installed underground pipes connected to sprinkler risers, center-pivot irrigators or hose attachment points for traveling guns or drag-hose applicators.

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[3] Includes acreages associated with the top ten crops by cumulative acres between 2011 and 2013.

Dairy farms are concentrated in the RM of Hanover; with fewer farms located in the RMs of Tache, De Salaberry, Franklin, and Ritchot (Maps 6-5 and 6-7). Broiler chicken and hatching egg operations are concentrated in the RM of Hanover, with fewer operations found in the RMs of Tache, Ritchot, and De Salaberry (Maps 6-5 and 6-7). Other livestock types found within the RSA might include beef cattle and turkey. There is no publicly available information on the locations of operations for these livestock within the RSA.

6.4.1.1.5 Specialty Agricultural Land Uses

Aerial Application

Aerial application is an important application method for crop protection products within the RSA due to soil constraints which may limit the use of ground application. Crop protection products used in the RSA include herbicides, insecticides, and fungicides (MASC, 2014). Production of high-value crops such as soybeans, canola, wheat, and corn (the crops with highest value in the RSA as shown in Figure 6.4-2) is typically associated with aerial spraying. Map 6-8 shows the relative likelihood of aerial application in the RSA, based on soil texture and drainage reported in the existing soil resource information for the RSA. The mapped areas of aerial application likelihood (Map 6-8) correspond closely to the aerially and non-aerially applied areas provided by the Manitoba Aerial Applicators Association (Alarie 2013) for a portion of the RSA.

Irrigation

Crops are primarily rain fed with a minor portion of the RSA under irrigated crop production. Small acreages in the RM of Macdonald are under irrigated potato and cereal production while a small acreage in the RM of Hanover is under irrigated potato production (Gaia Consulting Limited 2007).

Shelterbelts

Shelterbelts protect soil from erosion and are found throughout the western portion of the RSA. The construction of a linear project parallel to a shelterbelt results in the clearance of a wider portion of the shelterbelt compared to when the project is constructed perpendicular to the shelterbelt. As a result, the construction of a transmission line might increase soil erosion through the removal of windbreaks that were planted along field edges or between fields.

Other Specialty Agricultural Land Uses

Other specialty agricultural land uses that might be found in the RSA include organic and artisanal farming, bee keeping, and sod production.

Although organic farming is not common within the RSA, small acreages of organic flax, oats and red spring wheat might occur (MASC 2014). Issues of biosecurity can be a concern for organic crop producers due to the potential for disease spreading and pesticide contamination of soils on organic farms during transmission line construction. There is no publicly available spatial information on organic and artisanal farming, bee keeping and sod production land uses.

6.4.1.2 Recreational Land Use

Recreation and tourism activities occur in some areas throughout the RSA and include camping, hunting, fishing, snowmobiling and other recreational pursuits (Map 6-9).

The neighborhood of Sage Creek in the city of Winnipeg contains 61 acres of parklands and public reserve including over nine kilometers of walking and cycling trails, including trails and green space developed within the existing Manitoba Hydro ROW.

St. Malo Provincial Park is located in the southern portion of the RSA. Classified as a recreational park, it provides opportunities for camping, swimming and boating and is a popular site amongst residents in the area (Manitoba Conservation and Water Stewardship [MCWS], http://www.gov.mb.ca/conservation/parks/popular_parks/eastern/malo.html). Individuals have the opportunity to utilize the St. Malo and Debonair campgrounds which are located in the vicinity of the park.

The Arrowhead Campground and RV Park is located immediately south along Provincial Trunk Highway (PTH) 59 from the community of Ile des Chenes and provides recreationists with large sites and full service amenities. The community of Letellier also has a multi-use community park with a campground located near the south portion of the RSA. Private bed and breakfast facilities located within the RSA include: Gite deforest Bed & Breakfast in St. Pierre-Jolys; and Nestin' on Lakeview at St. Malo (Manitoba Regional Tourism Network, http://www.traveltomanitoba.ca/).

Just south of the city of Winnipeg and the Perimeter Highway, west of Waverley Street, there is one city owned park located within the RSA. La Barriere Park, along the La Salle River, offers recreational activities such as walking, biking, hiking, picnicking, outdoor sports, and cross-country skiing. There is an additional natural area in the St. Norbert area of the city along the La Salle River consisting of the La Salle Greenway, site for Camp Amisk, and the Trappist Monastery Forest (City of Winnipeg, Public Works, http://winnipeg.ca/publicworks/Maps/naturalareas.asp).

The Duff Roblin Parkway Trail is a multi-year landscaping and recreational development on the expanded floodway. The trail supports multi-use, non-motorized, four season recreational opportunities along the floodway including walking, hiking, biking, cross-country skiing and snowshoeing. The trail network, located on the west side of the floodway, begins near St. Mary's Road Bridge in the south and ends just south of Lockport to the north. In the future, the trail will link to the new Duff Roblin Provincial Park at the floodway inlet. Public staging areas are located at the provincial park and at Prairie Grove located on the northwest side of the PTH 59 South Highway Bridge. Other features include a community garden plot east of the St. Mary's Road Bridge on the east side of the floodway and a tree planting program on the west side of the trail (Manitoba Floodway Authority, http://www.floodwayauthority.mb.ca/po_recreation.html).

Areas which allow restricted hunting within the RSA includes Wildlife Management Areas and undesignated crown lands. Big Game Hunting Areas (GHAs) associated with the RSA include GHA Zones 33 and 35A and is regulated by MCWS (MCWS, Manitoba Hunting Guide 2013). Commonly hunted species include white-tailed deer, water-fowl and upland game birds[4]. There are no existing lodges or outfitters within the RSA.

Several rivers within the RSA provide anglers with a variety of fish species. These include the Red, La Salle, Seine, Rat, and Roseau Rivers, and Joubert Creek[5]. The regulated fishing season is open most of the year with the exception of spawning season from April 1 to May 10 (Manitoba Anglers Guide 2013).

The rivers and creek which flow in the RSA also provide paddling enthusiasts with excellent outdoor recreational opportunities to enjoy scenery in the south portion of Manitoba and typically require 1 to 2 days' worth of travel[6]. Designated recreational canoe routes within the RSA include the Red River Historic River and Riviere Aux Rats Canoe Route. The Rats canoe route commences near Carrick and proceeds to the junction with the Red River north of St. Agathe, before proceeding north and terminating in St. Boniface in Winnipeg (Berard 1973). The Red River was nominated as a Historic River in 2005 under the Canadian Heritage Rivers System (CHRS) for its cultural, recreational and natural heritage values. A Management Approach for the Red River has been prepared by Rivers West – Red River Corridor Association Inc. and identifies a Red River Management Area. This area includes the 175-km stretch of the Red River from Emerson to Netley Marsh at Lake Winnipeg, encompassing a 3.5-km corridor from either side of the Red River representing the remnant river lot boundaries (Hilderman Thomas Frank Cram 2006). In the RSA, this management area extends through the RMs of Ritchot, a portion of Franklin and all of Montcalm.

Snowmobiling is a popular recreational pursuit within the RSA. In conjunction with local clubs, Snowmobilers of Manitoba Inc. (SnoMAN) develop and maintain a network of trails with the goal of promoting safe and environmentally responsible snowmobiling. According to the 2013-14 SnowMAN map, numerous trails traverse the RSA in north-south (St. Adolphe to St. Jean Baptiste) and east-west (Carey to Aubigny) orientations. There are several snowmobile shelters associated with the trails, including at De Salaberry, St. Pierre and Grande Pointe[7]. A number of recreational walking trails also occur within the RSA, the most well-known being the Trans

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[4] Manitoba Conservation and Water Stewardship. 2013 Manitoba Hunting Guide. http://www.gov.mb.ca/conservation/wildlife/hunting/pdfs/sept17hunting_guide2013.pdf.

[5] Manitoba Conservation and Water Stewardship. 2013 Manitoba Anglers Guide. http://www.gov.mb.ca/waterstewardship/fisheries/recreation/pdf/2013_anglers_guide.pdf.

[6] Paddle Manitoba. Manitoba Paddling Routes: Interactive Map. http://www.paddle.mb.ca/manitoba-paddling-routes/.

[7] Snowmobilers Of Manitoba (Snoman). 2013-2014 Provincial Map. http://snoman.mb.ca/pdfs/Snoman-Prov-reduced.pdf.

Canada Trail (Map 6-9). The trail runs south from the city of Winnipeg to the US border through the RMs of Ritchot, De Salaberry, and Franklin and the Town of Niverville, Village of St. Pierre-Jolys and Emerson.

Golf course facilities in the RSA include: Southwood Golf and Country Club (18 hole) in St. Norbert along the La Salle River, Southside Golf Course (18 hole) located east of Grande Pointe off of PTH 59 (south of the Floodway); Shamrock Golf Course (9-hole) located east of PTH 59 and south of the Seine River; Maplewood Golf Club (18-hole) located north and west of St. Pierre-Jolys along the Rat River; and St. Malo Golf & Cabins (9-hole) off PTH 59 near St. Malo Provincial Park (Manitoba Regional Tourism Network http://www.traveltomanitoba.ca/).

6.4.2 Protected Areas, Parks and Conservation Lands

Manitoba's Protected Area Initiative (PAI) is administered by Manitoba Conservation and Water Stewardship (MCWS). The mandate of MCWS is to protect Manitoba's biological diversity through legal means by designating a series of Crown lands as ecological reserves, provincial parks, and wildlife management areas (WMAs) (see Map 6-4). Protection of these areas is provided through legislation including *The Provincial Parks Act and The Wildlife Act.* All resource development and agricultural activities are prohibited in these areas, although hunting, trapping and fishing are allowed with the appropriate permits.

The Duff Roblin Provincial Park, located in St. Norbert, was named after Manitoba's former Premier Duff Roblin and was designated to commemorate his efforts in the development of Manitoba's floodway around Winnipeg. The park was given heritage status and is located appropriately at the floodway gate and diversion channel, which are key components to Winnipeg's flood protection infrastructure. The park serves as a staging area for access to recreation trails, tobogganing, fishing and viewing opportunities. The Southern Loop corridor is currently proposed to cross over the Duff Roblin Provincial Park[8].

The Jennifer and Tom Shay Ecological Reserve is located near the community of St. Adolphe. The area has been granted protection through Manitoba's Protected Areas Initiative, as it contains rare and representative physical and biological features of a river-bottom forest ecosystem. The Ecological Reserve contains a relatively high level of biodiversity of plants and animals which are characterized as having a high degree of flood resistance due to annual flooding in the spring and summer months. Several species found in the area have been identified as species of Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC)[9].

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[8] Manitoba Conservation and Water Stewardship. Duff Roblin Provincial Park. https://www.gov.mb.ca/conservation/parks/popular_parks/central/duff.html. Accessed March 31, 2014.

[9] Manitoba Conservation and Water Stewardship. Manitoba's Protected Areas Initiative: Jennifer and Tom Shay Ecological Reserve. http://www.gov.mb.ca/conservation/pai/mb_network/pdf/jennifer_tomshay.pdf. Accessed March 31, 2014.

The Province of Manitoba also designates specific WMAs for “better management, conservation and enhancement of the wildlife resources of the province." Similar to the PAI, WMAs exist to protect wildlife, the environment and promote people’s enjoyment of natural areas. Hunting and trapping are generally permitted in WMAs but may be subject to restrictions or prohibited in some areas[10].

The St. Malo WMA, located in the southern extent of the RSA, is a cooperative wildlife management area characterized by flat to gently rolling topography. The WMA has a good cover of aspen-oak forest with remnants of tall-grass prairie. The St. Malo WMA protects habitat for deer, ruffed grouse and neo-tropical birds. There are two distinct geographical components of the St. Malo WMA. The east unit is adjacent to the west side of PTH 59 while the west unit can be accessed on the Trans Canada Trail, starting from the town or St. Malo or the community of Carlowrie. Most of this unit is forest but there is a large wetland in the northwest corner.

The Rat River WMA is located in the easternmost portion of the RSA. This WMA protects a managed marsh as well as a surrounding upland of aspen and oak forest interspersed with meadows of native tall-grass prairie. The marsh provides flood protection for the area by absorbing spring melt destined for the Rat River; the wetland then becomes a suitable breeding ground for waterfowl in spring. Bird species of note include the black and Forester’s tern, marsh wren, Wilson’s snipe, swamp sparrow and the rare least bittern[11].

The Pansy Pasture Area of Special Interest (ASI) is located in the southeastern portion of the RSA, and is divided between the RMs of Hanover and Franklin.

The Nature Conservancy of Canada owns a parcel of land in the RM of Franklin, in the southeastern portion of the RSA, near the community of Roseau River. The area is legally protected from development for the purposes of preserving natural areas. The Nature Conservancy of Canada is a private organization who purchases lands from owners who are interested in the protection, management and restoration of natural areas[12].

6.4.3 Resource Use

Agriculture is the dominant resource use in Southern Manitoba as discussed in Section 6.4.1.1. Other resource use activities in the RSA include: timber utilization, woodlot management, hunting, trapping, mineral extraction, and domestic resource uses. During the PEP conducted for the Project, issues and concerns were identified related to resource harvesting in the region.

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[10] Manitoba Conservation and Water Stewardship. Wildlife Management Areas. http://www.manitoba.ca/conservation/wildlife/habcons/wmas/index.html. Accessed March 31, 2014.

[11] Manitoba Conservation and Water Stewardship. Wildlife Management Areas: Red River Region. http://www.gov.mb.ca/conservation/wildlife/habcons/wmas/redriver.html. Accessed March 31, 2014.

[12] The Nature Conservancy of Canada. The Conservation Process. http://www.natureconservancy.ca/en/what-we-do/conservation-process/. Accessed March 28, 2014.

These included: concerns that construction would disrupt fur-bearing animals and affect trapping; and the potential effects to wildfowl staging.

No commercial forestry management licences exist within the RSA. Manitoba Conservation administers domestic forest utilization through the issuance of timber permits. Most timber permits on Crown land are issued for fuelwood purposes. The timber permit system allows for personal forest utilization of up to 25 cubic metres (MCWS, Forestry Branch 2014). Some private landowners may manage woodlots on their own properties under the auspices of the Manitoba Woodlot Association's Private Land Resource Planning initiative. Conservation Districts can also provide support programs to municipalities that focus on management and rehabilitation of riparian areas, establishment and maintenance of field shelterbelts, triple-row wildlife belts, or block plantings. Locations of private woodlots are shown on Map 6-10.

The RSA provides hunters with excellent big game hunting opportunities during specified seasons. Manitoba's big game hunting is administered by Manitoba Conservation and Water Stewardship within Game Hunting Area (GHA) zones. GHA zones associated with the RSA include 33 and 35A. Species hunted within the RSA would include coyote, deer, and migratory birds such as Canada goose. The entire RSA is located within Manitoba's Open Trapping Area Zone 1. Typical furbearing species which are harvested in this zone include badger, coyote, fox, marten, raccoon, wolf and weasel[13].

In some instances, aggregate resources have been identified by Rural Municipalities within the RSA in their Development Plans and associated By-laws. These documents give legal means for the Municipalities to restrict developments such as residential, commercial, institutional and recreational from sites of mineral extraction. Areas with known aggregate resources which have not yet been developed for extraction should be limited to non-intensive agriculture or other uses which do not limit access to the resource. Within the RMs of Macdonald and Ritchot, there are no potential aggregate resources. Sand and gravel resources in the RMs of Hanover and Tache comprise beach ridges, glaciofluvial and deltaic deposits. Gravel extraction has occurred in glaciofluvial and beach ridge deposits in the Blumenort area of Hanover (Manitoba Department of Energy and Mines 1979). In the RM of De Salaberry, potential aggregate resources have been identified in several deposits over between Joubert Creek and the Rat River and to the south of St. Malo (RM of De Salaberry Development Plan 2011).

Private quarry permits and quarry leases are principally located in the vicinity of Grunthal in the RM of Hanover, southeastern portion of the RM of De Salaberry, and the eastern portion of the RM of Franklin (see Map 6-10). Quarry and pit locations in this part of southern Manitoba are concentrated in the same areas around Grunthal and along PTH 59 south to the US border (MMM Group Limited 2011).

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[13] Manitoba Conservation and Water Stewardship. 2013-2014 Trapping Guide. http://www.gov.mb.ca/conservation/wildlife/trapping/pdf/2013_2014trappingguide_web.pdf. Accessed March 28, 2014.

Resource Use

Local resource use activities within the RSA consist of fishing, berry picking, and likely wood gathering (firewood). Residents likely participate in traditional and contemporary (recreational and subsistence) fishing throughout the region. Berries of interest in southern Manitoba include Saskatoon berry, raspberry, and strawberry. There are a few U-Pick farms located in the RSA, notably in the Sandford area, La Salle area, St. Norbert area, and at Grunthal (Prairie Fruit Growers Association, http://www.pfga.com/).

The RSA falls within GHAs 33 and 35A which are recognized areas for Métis natural resource harvesting by the Province of Manitoba (MCWS, Metis Natural Resource Harvesting Map 2013). Fishing for species such as jackfish, pickerel, suckers, and perch occurred in an area along the Rat River and Joubert Creek south of St. Pierre-Jolys. Small animal harvesting for rabbit, coyote, beaver, waterfowl, and upland birds occurred in areas around Niverville, St. Pierre-Jolys, St. Malo, and Roseau River. Large animal (deer) harvesting occurred in areas surrounding La Rochelle/St. Malo, Roseau River and Dominion City (Manitoba Métis Federation 2011).

The traditional territory of the Roseau River First Nation includes all or part of the Red River corridor. Members of the community continue to exercise aboriginal and Treaty rights along the river, including hunting, trapping, fishing and gathering native plants and berries for various uses. There are a number of First Nation spiritual or ceremonial sites found along the River corridor (Hilderman Thomas Frank Cram 2006). Roseau River First Nation considers the Roseau River Rapids site an important sacred site as it is the location of Midewiwin spiritual rites and ceremonies, as well as a source of medicinal plants (http://www.gov.mb.ca/chc/hrb/pdf/crow_wing_2.pdf).

6.4.4 Local Government Organization

Local government jurisdiction in southern Manitoba is divided primarily between RMs and urban centres (incorporated cities, towns, and villages). Many smaller urban settlements and communities have no independent municipal status.

Local government responsibilities are generally under the jurisdiction of individual municipalities or, in the case of larger urban settlements, urban municipalities. All or part of the following municipal jurisdictions are included in the RSA: the City of Winnipeg, the towns of Niverville and St-Pierre-Jolys, and the following seven Rural Municipalities (RMs): De Salaberry, Franklin, Hanover, Macdonald, Montcalm, Ritchot, and Tache.

The City of Winnipeg, Town of Niverville, the Village of St-Pierre-Jolys, and each RM is governed by a Reeve or Mayor and an elected council. Each administrative district has a range of responsibilities including, but not limited to the maintenance of infrastructure, the provision of services and utilities as well as land-use planning within their respective jurisdictions.

Land use planning responsibility, which extends to land-use control and development policy is in some cases shared to a degree with regional authorities, such as Planning and Conservation Districts. Only one Planning District – the Macdonald-Ritchot Planning District (MRPD), is located within the RSA.

There are also two Conservation Districts within the RSA as follows: La Salle-Redboine Conservation District, including the RMs of Macdonald and part of Ritchot; and Seine-Rat River Conservation District, including the RMs or portions thereof, of Ritchot, Tache, Hanover, and De Salaberry. The Seine-Rat River CD is located to the southeast of Winnipeg and encompasses two watersheds, the Seine River and the Rat River watersheds. Conservation Districts (CDs) are established under *The Conservation Districts Act* and are formed as a partnership between the province and local municipalities to protect, restore and manage land and water resources on a watershed basis. The Seine Rat River Conservation District's integrated watershed management plan was completed in 2009 and the CD has developed an integrated watershed management plan for the Rat Marsh River Watershed (http://srrcd.ca/wp-content/uploads/2011/04/Rat-Marsh-River-IWMP-2013.pdf).

Designated flood areas within the province are governed by *The Water Resources Administration Act W70* (2002). Permanent structures constructed within the boundaries of a designated flood area must be provided with flood protection in accordance with the Designated Flood Area Regulation 59/2002. The Red River Valley Designated Flood Area encompasses RMs within the RSA, including: most of the RM of Ritchot; the southeastern portion of the RM of Macdonald; the Town of Niverville and the extreme western portion of the RM of Hanover; the western quarter of the RMs of De Salaberry and Franklin; and most of the RM of Montcalm.

In addition to the ten municipal jurisdictions comprising the RSA, there are a number of incorporated communities and settlements (Map 6-5). These include:

- Oak Bluff (at PTH 3 and PTH 101) and La Barriere (along the La Salle River) in the RM of Macdonald.
- St. Norbert community north PTH 101 in the city of Winnipeg.
- Grande Pointe, south of the city of Winnipeg, and Ile des Chenes (at PTH 59 and PR 405) in the RM of Ritchot.
- Prairie Grove (west of PR 207), Oak Island Settlement (southeast of Ile des Chenes) and Linden in the RM of Tache.
- Dufrost (along PTH 23), La Rochelle (at PTH 59), Otterburne (at PR 623), Rat River Settlement (between Otterburne and St. Pierre Jolys), St. Malo and St. Malo Settlement (at PTH 59 and PR 630) in the RM of De Salaberry.
- Grunthal, Hockstadt, Kleefeld, and New Bothwell (all along PR 216) and Tourand (along PTH 59) in the RM of Hanover.

- Arnaud (on PR 217), Carlowrie (at PRs 217/218), Dominion City (east of PR 200), Green Ridge (west of PR 218) and Ridgeville (along PR 218) in the RM of Franklin.
- Letellier (at PTH 75), Ste. Elizabeth (on PR 633), St. Jean Baptiste (at PR 628 and PTH 75) and St. Joseph (at PR 420) in the RM of Montcalm.

6.4.5 Property Ownership Patterns and Rural Residential Development

In southern Manitoba, land is typically divided up using the section-township-range system. The exceptions to this general pattern occur at Grande Pointe, in the community of Lorette, and the Oak Island Settlement southeast of Ile des Chenes, between Otterburne and St. Pierre Jolys, near St. Malo, and north of Emerson, where long lot river land-use survey is evident. Most of this land consists of privately-owned parcels, which are predominantly used for various types of agriculture. Publicly-owned parcels of land are also scattered throughout the RSAs, and are used for a range of purposes including landfills, cemeteries, and municipal infrastructure.

Crown and public lands include several publicly-owned parcels set aside as ecological reserves, municipal parks, provincial parks and wildlife management areas (WMAs). These include: Jennifer and Tom Shay Ecological Reserve, La Barriere Park (City of Winnipeg), Duff Roblin Provincial Park, St. Malo Provincial Park, St. Norbert Provincial Heritage Park, Trappist Monastery Provincial Heritage Park, St. Malo Area WMA, and parcels of the Rat River WMA. The extent of Crown lands in the RSA is limited to scattered individual parcels, involving eight sections of land in the RMs of Ritchot, De Salaberry, Hanover, Franklin, and Montcalm. Other agricultural Crown leased lands are located in the RMs of Ritchot, Tache (extreme eastern portion) and Hanover. There are also municipal-owned lands that are within individual RM boundaries including Macdonald, Hanover, De Salaberry and Franklin. The City of Winnipeg also owns two parcels of land outside of its boundary in the RM of Ritchot along the La Salle and Seine rivers in the RSA. Other parcels of land are owned by non-governmental agencies or groups, and include: the Steinbach Community Development Corporation (in Hanover); St. Malo and District Wildlife Association Inc. (in De Salaberry and Franklin); and the Pembina Valley Water Cooperative (in Montcalm).

The Roseau River First Nation Reserve is the only First Nation reserve located within the RSA. The community is an Ojibway-speaking Anishinabe First Nation; the reserve consists of two parcels of land that make up a total of 3,066 hectares (7,576 acres) (Roseau River Anishinabe First Nation 2013), with Roseau River Indian Reserve No. 2 covering 2,135 hectares (5,276 acres) and Roseau Rapids Indian Reserve No. 2A covering 931 hectares (2,300 acres). Based on provisions under the Treaty Land Entitlement, a land settlement payment was provided to the RRAFN in 1996 and the Roseau River Trust Fund was established. Part of the mandate of the trustees of this fund has been to purchase and acquire 2,372 hectares (5,861 acres) of new lands within 15 years of the 1996 settlement (RRAFN, n.d.). These newly acquired lands are held under a company titled RRFNT AKI Property Holdings Ltd. and currently all new lands are located within the RM of Franklin. Between 1998 and 2002 the RRAFN acquired 1,528 hectares (3,775 acres) of new land of which 1,046 hectares (2,585 acres) have been advanced to INAC for conversion to Reserve status (RRAFN, n.d.). These lands are concentrated in the vicinity outside of Roseau River Indian Reserve 2 (seven parcels) and in the vicinity and south of Roseau Rapids First Nation Reserve 2A (six parcels) (Rural Municipality of Franklin Property Ownership Map 2010).

Areas of rural residential development are concentrated within parts of RMs within the RSA, including the RMs of Macdonald (Oak Bluff), Ritchot (Grande Pointe, Ile des Chenes), Tache (Oak Island Settlement, Linden), Hanover (New Bothwell, Kleefeld, Hockstadht, Grunthal), De Salaberry (Dufrost, Otterburne, St. Malo, St. Pierre Jolys, and St. Pierre Sud and La Rochelle), Franklin (Arnaud, Carlowrie, Dominion City, Green Ridge, Ridgeville, and Senkiw) and Montcalm (Letellier, St. Jean Baptiste, St. Joseph). The distribution of private dwellings in the RSA is particularly concentrated in and around these same community areas. Some of these dwellings are associated with agricultural operations and also likely include farm accessory buildings.

A real estate firm, Qualico, owns property on either side of the Manitoba Hydro ROW within the city of Winnipeg south of St. Vital Station to the east of Lagimodiere Boulevard and north of the Perimeter Highway. The neighborhood of Sage Creek is under development with existing and proposed developments including homes, businesses within a Village Centre and a proposed school.

Hutterite colonies located in the RSA include: Vermillion Colony (southwest of La Salle in the RM of Macdonald); Cascade Colony and Crystal Spring Colony (north of Otterburne in the RM of De Salaberry); Suncrest Colony (west of Kleefeld in the RM of Hanover); Oak Bluff Colony (northeast of St. Jean Baptiste in the RM of Montcalm); Blue Clay Colony (west of Arnaud in the RM of Franklin); Glenway Colony (northeast of Dominion City in the RM of Franklin); and Ridgeville Colony (north of Ridgeville in the RM of Franklin).

Cemeteries and churches are generally associated with communities and settlement areas within the RSA. Outside of incorporated centres, there are numerous cemetery sites located near the following areas: Oak Bluff (RM of Macdonald); Ste. Adolphe, Ste. Agathe, St. Norbert, and Ile des Chenes, including a pet cemetery (RM of Ritchot); Prairie Grove (RM of Tache); Kleefeld, Grunthal, Hochstadt, and Randolph (RM of Hanover); St. Malo, Otterburne, Dufrost, Ste. Elizabeth, and St. Pierre (RM of De Salaberry); Arnaud, Dominion City, Green Ridge, Senkiw, Ridgeville, and Roseau River (RM of Franklin); and Ste. Jean Baptiste, St. Joseph, and Letellier (RM of Montcalm).

6.4.6 Land-Use Development Controls

Municipalities may adopt development plans and zoning bylaws to guide land-use decisions within their boundaries. In the absence of such controls, provincial land-use policies apply as a guideline for reviewing subdivision applications and development proposals (*Provincial Land Use Policies Regulation No. 184/94*). The municipalities in the RSA have a variety of development controls in place. A summary is provided below:

- Development within the City of Winnipeg is subject to *OurWinnipeg Plan By-law No. 67-2010* and the *Winnipeg Zoning By-law No. 200/06*. Three neighbourhood areas in south Winnipeg are, or will be, subject to their own secondary plans. Secondary plans pertain to economic development or the enhancement or special protection of heritage resources or sensitive lands. Areas with existing plans are South St. Boniface area Structure Plan (*By-law No. 158/2005*; The City of Winnipeg 2005) and St. Vital Perimeter South Secondary Plan (*By-law No. 1735/77;* The City of Winnipeg 2002). It is anticipated that a secondary plan will eventually be prepared for a third area: the St. Norbert area.
- As members of the Macdonald-Ritchot Planning District, the RM of Macdonald and the RM of Ritchot are subject to the Macdonald-Ritchot Planning District Development Plan (*By-law No. 2/10*). The RM of Macdonald and RM of Ritchot are also subject to their own zoning by-laws (*RM of Macdonald (1995) Zoning By-law No. 15/95* and *RM of Ritchot (2003) Zoning By-law No. 28-2003*). In addition, within the RM of Ritchot (2013), the Grande Pointe area is subject to its own Secondary Plan (*By-law No. 17-2013*).
- The RM of Tache is subject to (2000) *Development Plan By-law No. 4-2000* and (2009) *Zoning By-law No. 12-2009.*
- The RM of Hanover (2009) has *Development Plan By-law No. 2170* and *Zoning By-law No. 2171*. The Local Urban District (LUD) of New Bothwell is also subject to these controls.
- Development in the RM of De Salaberry is subject to (2011) *Development Plan By-law No. 2194-04* (and amendments) and (2005) *Zoning By-law No. 2208-05* (and amendments).
- The RM of Franklin has yet to adopt a development plan and zoning by-law. As such, development applications and proposals within the RM are subject to the Provincial Land Use Policies Regulation No. 184/94. Policy #1A.4 states that wherever possible, development is to be compatible and in harmony with other land uses.
- Development in the RM of Montcalm (1995) is subject to a development plan and *Zoning By-law No. 512/95*.

The lands traversed by the proposed St. Vital to Letellier transmission line predominantly consist of rural farmsteads; most lands outside the urban centres are designated either Agricultural or Rural:

- In the city of Winnipeg, lands south of the Perimeter Highway on both sides of the Red River are designated as "Rural Agricultural" under the city's development plan. The area encompassing St. Vital Station and an area to the north is designated as "Precinct" and "New Community." The Sage Creek area to the south is designated as a "Recent Community" under the city's development plan. Under the City of Winnipeg zoning by-law, lands south of the Perimeter Highway in Fort Garry west of the Red River are predominantly zoned as "A–Agricultural," including the existing ROW for the Southern Loop corridor. There is one area zoned "R1–Residential Single Family" north of the existing ROW, just west of Pembina Highway. East of the Red River in South St. Vital, lands are predominantly zoned as "A-Agricultural" including the Floodway, and "RR5–Rural Residential 5" along the north side of the Floodway. At St. Vital Station, the station site and existing ROW are zoned as "PR2–Parks and Recreation 2 (Community)" and "RR5." South of the station site and east of Lagimodiere Boulevard to the Perimeter Highway, lands are zoned for a mixture of uses, which includes the Sage Creek residential development, as "R1," "PR1–Parks and Recreation 1," "RMF–Residential Multi-Family," and "C2–Commercial Community" and as "RR5" for the existing ROW. South of the Perimeter Highway, east of Lagimodiere Boulevard to the city limits, lands are zoned as "A–Agricultural," including the existing ROW.
- In the RMs of Macdonald and Ritchot, lands are generally designated as "GZ–Green/Agricultural Policy Area" under the development plan. An area south of Oak Bluff is designated as "EV–Environmental Policy Area" established for a lagoon. The Grande Pointe area is largely designated as "RC–Rural Centre Policy Area" and "EC–Enterprise Centre Policy Area." The Seine River is designated as "EV–Environmental Policy Area." In the Ile des Chenes area, there is a small area west of PTH 59 and Ile des Chenes that is designated as "RC–Rural Centre Policy Area." Just to the south and north of an east-west drain there is an area designated as "EV–Environmental Policy Area" for a lagoon.
- The RM of Tache designates land within the RSA adjacent to the transmission line route predominantly as "General Agricultural Area" under its development plan.
- In the RM of Hanover, lands are generally designated as "General Agricultural Area" or "Rural Area" under the development plan.
- The RM of De Salaberry designates the majority of land within the RSA as "Agriculture 1" or "Agriculture 2." Two are "Rural Residential" areas are located in close proximity to the transmission line route, one to the east of the Village of St. Pierre Jolys along Joubert Creek and the other at St. Pierre Sud along the Rat River north of La Rochelle.
- In the RM of Montcalm, the majority of the land is used for Agriculture.

In rural and agricultural areas, development plans note that utilities are a land use, subject to applicable municipal zoning bylaws and should be developed in a manner that minimizes potential incompatibilities with neighboring land uses.

6.4.7 Infrastructure and Services

6.4.7.1 Transportation, Communication, Utilities and Facilities

The RSA includes several infrastructure installations and networks (Map 6-9). The infrastructure networks include linear rights-of-way for provincial and municipal roadways, railways, hydro transmission lines, and pipelines, fibre-optic cables, and water and sewer infrastructure where available. Infrastructure installations include airfields, communication towers, hydro transformer and gas pipeline stations, and solid waste disposal sites.

6.4.7.1.1 Road Network

The lands traversed by the Project can be accessed by Provincial Trunk Highways (PTHs), Provincial Roads (PRs) and smaller mile or half mile roads. Key highways and roads include (Map 6-9):

- PTH 3 – is a two-lane paved Primary Arterial (as classified by MIT) that runs southwest from Winnipeg to Oak Bluff, Sanford and beyond.
- PTH 23 – is a two-lane Secondary Arterial that runs east-west from PTH 59 to Morris.
- PTH 52 – is a two-lane paved Secondary Arterial that runs east-west from Steinbach to PTH 59 within the RSA.
- PTH 59 – is a two-lane paved Expressway that runs north-south in southern Manitoba.
- PTH 75 – is a four-lane paved Expressway that runs north-south in southern Manitoba and dissects the south-westernmost portion of the RSA.
- PR 201 – is a Secondary Arterial that runs east-west throughout the southern portion of the RSA and passes through Letellier.
- PR 216 – is a Collector “A” road that runs north-south from PTH 52 to PTH 59.
- PR 207 – is a Collector “A” that runs from Deacon’s Corner along the north-east portion of the RSA to Ste. Anne.
- PR 405 – is a Collector “A” that runs east-west from PR 206 to PR 300.
- PR 206 – is a Collector “A” that runs north-south within the RSA from PTH 1E to PTH 52.

PTH 75 is classified as a Regional Transportation Advisory Committee (RTAC) route which has a maximum prescribed gross vehicle weight (GVW) of 63,500 kg. PTH 3, 52, 59, and PR 207 and 405 are classified as RTAC routes which have a maximum prescribed gross vehicle weight of 62,500 kg. PR 206 is a seasonal RTAC route from December 1 of any year, ending on the last day of February in the ensuing year. PTH 23 and PR 216 are classified as Class A1 highways and have a maximum prescribed GVW of 56,500 kg. PR 201 is classified as Class B1 and has a maximum prescribed GVW of 47,630 kg (*The [Manitoba] Highway Traffic Act*). In addition to the above highways and roads, the majority of the rural areas are also connected by a square mile grid or gravel or dirt roads which are maintained by the respective RMs.

There is potential for future road development within the RSA, notably the twinning of PTH 59 and PTH 52. The Province is also working on the rehabilitation of PTH 75 from Winnipeg to the Emerson border crossing to address perennial flooding concerns associated with the Red River. Approximately 77 km along PTH 75 have been completed and another 27.5 km were under construction in 2011-2012 from PR 305 to, and including, Main Street in the Town of Morris. Future projects under this initiative include: raising the northbound lanes from St. Jean to Morris (11 km) and Morris to Aubigny (11 km), including a new bridge; surface improvements consisting of concrete rehabilitation from Letellier to Emerson (17 km), and reconstruction from Aubigny to Ste. Agathe (16 km) and from Ste. Agathe to Ste. Adolphe (11 km); and construction of bypasses at St. Norbert and Morris (Manitoba Infrastructure and Transportation, Province of Manitoba http://www.apegm.mb.ca/pdf/PD_Papers/PTH75FloodProtection.pdf).

Traffic Volumes

The 2012 Average Annual Daily Traffic (AADT) volumes, defined as the number of vehicles passing a point on an average day of a given year, were collected from MIT for the main thoroughfares within the RSA. These volumes are summarized in Table 6.4-3 below.

Table 6.4-3: 2012 Average Annual Daily Traffic (AADT) for Select Routes

Road No.	Station No.	Location	AADT
PTH 3	51	0.3 km southwest of PTH 2	5,010
PTH 23	167	1.6 km west of PTH 59	1,310
PTH 52	169	East of PTH 59	4,030
PTH 59	89	1.9 km north of PTH 52	5,960
PTH 75	31	2.8 km north of PR 243	3,420
PR 201	163	West of PTH 59	450
PR 216	804	North of north junction at PR 205	2,650
PR 217	786	West of west junction of PR 218	210
PR 403	2262	West of PR 216	850

Source: Manitoba Highway Traffic Information System, 2012.

Based on 2012 traffic data obtained from select permanent traffic count stations, the types of vehicles operating on the major roads within the RSA are principally passenger vehicles (60-80%), truck pick-ups and vans (20%). For the truck traffic vehicle classes the majority of vehicles were single trailers (between 20 and 40% approximately) followed by single truck units (approximately 10 to 20% or less). The exception to this was from data on PTH 75, where truck traffic accounted for over 60% (approx.) of total traffic (Manitoba Infrastructure and Transportation and University of Manitoba Transport Information Group 2012).

6.4.7.1.2 Railways

The nearest VIA rail station to the RSA is located at 123 Main Street in Winnipeg, MB (Via Rail 2013). Canadian National (CN) has a station located in Lorette (on a line running southeast into the United States) and a station located in St. Jean Baptiste and Letellier on a line running south from Winnipeg to Emerson (CN Rail 2013). A Canadian Pacific (CP) rail line runs north-south from Winnipeg to Emerson with stations located in Grand Pointe, Dufrost, Arnaud and Dominion City (CN Rail 2013). A second CP rail line runs south between Winnipeg and Morris generally along PR 330.

6.4.7.1.3 Transmission Lines and Facilities

There are six existing transmission lines that cross through the RSA. Two 230-kV transmission lines cross through the RSA from La Verendrye to Letellier (Y5TL) and Stanley (outside the RSA) to Letellier (S60L). Two 115-kV transmission lines (VT63 and VJ50) commence at St. Vital Station in the city of Winnipeg and cross through the northeasterly part of the RSA to Ile des Chenes (TransCanada Pipeline [TCPL] Compressor Station), and Randolph and Hanover Stations in the Linden and Steinbach areas, respectively. Two other 115 kV transmission lines (YF11 and YM31) commence at La Verendrye Station and cross through the northwestern part of the RSA to Rosenfeld and Morden, respectively (outside of the RSA).

Transformer stations within the RSA include Randolph, Hanover and Letellier. TCPL maintains natural gas compressor and gate stations at Ile des Chenes and Landmark in the northeastern part of the RSA.

The St. Joseph Wind Farm is located in the RM of Montcalm around the community of St. Joseph. The Wind Farm has 60 turbines with a total rating of 138 megawatts. First proposed in 2007, the turbines started operation in early 2011. The power plant covers about 125 square kilometres west of PTH 75.

6.4.7.1.4 Underground Pipelines

TCPL maintains its Canadian Mainline natural gas pipeline system through the RSA. The mainline crosses south of the city of Winnipeg to Ile des Chenes, through the northern portion of the RSA, linked to a series of compressor stations, including Ile des Chenes and at Landmark east of the RSA. TCPL has a second mainline that runs between Winnipeg and Emerson. Manitoba Hydro/Centra Gas maintains a network of its own natural gas distribution pipelines in the RSA, including lines between Winnipeg, Ile des Chenes and Niverville; between Winnipeg, Oak Bluff and Sanford; and from Winnipeg to La Salle. Other Manitoba Hydro/Centra Gas pipelines run between Ile des Chenes and New Bothwell; Niverville to Ste. Agathe and Kleefeld; between Otterburne, St. Pierre Jolys and Grunthal; and between Dufrost and St. Malo. The Winnipeg Oil Pipeline runs south from Winnipeg through the RM of Ritchot in the RSA, just west of Ile des Chenes, to St. Adolphe and beyond.

6.4.7.1.5 Licensed Airstrips/Aerodromes

The nearest major national and international airport to the RSA is the Winnipeg James Armstrong Richardson International Airport. Lyncrest Airfield is a general aviation airfield located south of Dugald Road and north of PTH 1E in the RM of Springfield adjacent to the RSA and is privately-owned by a flying club. The airfield is used by Shock Trauma Air Rescue Society (STARS) helicopters to deliver patients to the St. Boniface and Concordia hospitals in Winnipeg.

The City of Steinbach Airport (a general aviation airport), is located adjacent to the RSA, and has an 885 m (2,900 ft) asphalt runway (City of Steinbach 2008). A second airport at Steinbach is located south of the city (Steinbach South Airport). Two other aerodromes in the RSA are located southwest of Starbuck (Starbuck Airport) and at St. Pierre Jolys (Carl’s Field). There were five privately owned airstrips identified during public engagement. These were located on SE-8-5-4E (Catellier), SW-23-6-4E (Maurer), NE12-6-4E (Bueckert), NE-4-8-4E (Falk) and NW-15-5-4E (Berard). One other airstrip was identified north of the Southern Loop corridor in SE21-9-2E (Papp). An additional airstrip, owned by Mr. Paul Sabourin, was avoided during the siting process. Dale Air Services, based in Morris provides agricultural services to farmers in the locality.

6.4.7.1.6 Communication Facilities

Communication facilities/towers, including microwave and cellular towers, can be found across Southern Manitoba. These facilities are maintained by telephone communication companies, broadcast companies and radio stations and corporations, the Government of Canada, Provincial and municipal governments and utility companies. There are approximately 848 communication towers and broadcast antenna locations in the RSA.

6.4.7.1.7 Municipal Water and Solid Waste Disposal Facilities

Water treatment, wastewater facilities (including lagoons) and landfills maintained by the RMs are also located within the RMs traversed by the Project.

Water in the RMs is provided through a combination of municipal water supply systems and private residential wells. Water is typically sourced from surface water and groundwater conveyed by a distribution system through a series of networked piping. Sewer and wastewater infrastructure is also provided by the RMs; however, some residences are not connected to the sewer system and use private septic tanks.

The regional water distribution system in the RM of Ritchot utilizes groundwater sources from an aquifer in the RM of Hanover near New Bothwell. The RM of Macdonald utilizes the La Salle river as its water supply. An extensive network of rural water pipelines has been developed to serve the RMs of Ritchot and Macdonald. Potable water is supplied by a water treatment plant located at Sanford (Manitoba Intergovernmental Affairs n.d.).

All areas within the RM of Franklin and RM of Montcalm are served by a municipal water system. Water is supplied by the Pembina Valley Water Cooperative and also from community wells throughout the region. There is a water treatment plant in Letellier through which water is distributed to rural areas and towns via a pipeline network. There is a public sewer system at Dominion City, but there is no other sewage infrastructure for the remainder of the municipality. Similarly, there is a public sewer system for St. Joseph, St. Jean-Baptiste, and Letellier only in the RM of Montcalm (Roseau River Watershed Plan 2007).

RMs typically provide solid waste disposal services through the collection, recycling or disposal of wastes, or through the recycling or disposal of wastes received at waste disposal grounds or waste transfer stations. The RM of Ritchot's community landfill is located on Bernat Road, south of Leclaire Road, north of Twin Creek Road. New cells of the Richot Landfill have already begun taking in waste and are located in line with the previous alignment.

The municipality also has garbage and curbside recycling pickup (Partnership of the Manitoba Capital Region Profile 2012). Two sewage lagoons are located northwest of Ste. Agathe and south of Ile des Chenes in the RM of Ritchot. In the RM of Hanover, there are two sewage lagoons north of New Bothwell and north of Niverville respectively. There is a site for waste disposal within each of the RMs of Franklin and Montcalm (near St. Jean Baptiste and Letellier) and garbage pick-up for both residential and commercial properties. Recycling services include a drop-off program at the waste disposal site, as well as home pickup service in some areas. Miller Environmental Corporation operates a hazardous waste treatment and recycling facility in the municipality of Montcalm (Roseau River Watershed Plan 2007).

The RM of Hanover and the Town of Niverville partnered to create the Hanville Industrial Park. The park is located to the northeast on the outskirts of Niverville on 72 hectares (180 acres) of land and is located to provide highway transportation access to major routes (i.e., PTH 59, PTH 75) and access to a CPR rail line (Hanover and Niverville: "Progress through Partnership," RM of Hanover Website, http://www.hanovermb.ca/).

6.4.7.1.8 Floodway System and Flood Protection

The Red River Floodway is located on the south and east sides of the city of Winnipeg. The Floodway system includes the floodway inlet, floodway channel, west dike, and floodway outlet.

Recently expanded to handle a one-in-700 year flood, the floodway's channel capacity is 140,000 cubic feet per second (cfs). The 45 km (27 mi.) long west dike is located south of Winnipeg, providing flood protection for the city and preventing Red River floodwaters from flowing into the La Salle River and then entering Winnipeg (Province of Manitoba Flood Information Website).

There are 10 community ring dikes in the Red River Valley portion of the RSA providing flood protection up to 1997 flood levels. The communities with ring dikes are: Grande Pointe, St. Adolphe, and St. Agathe in the RM of Ritchot; Niverville in the RM of Hanover; St. Pierre-Jolys in the RM of De Salaberry; Dominion City and Roseau River in the RM of Franklin; and Emerson, Letellier and St. Jean-Baptiste in the RM of Montcalm. Ring dikes and other forms of flood works protect 95% of homes, businesses and farms and in the valley (Province of Manitoba Flood Information, http://www.gov.mb.ca/flooding/fighting/floodway.html).

6.4.7.1.9 Community Services

The following provides a general description of the various community services and amenities available in the city of Winnipeg, the Town of Niverville, the Village of St. Pierre-Jolys, and the six RMs within the RSA. These services include fire services, ambulance services, police service, and health and social services.

The City of Winnipeg provides residents with all the above services. Major hospitals within the RSA are located in Winnipeg and provide 24-hour emergency and acute care services. The closest community hospital is Victoria General Hospital, a 203-bed acute-care facility, located in South Winnipeg on Pembina Highway in Fort Garry.

All the RMs (Section 6.4-1) provide fire services. The RMs of Ritchot, Hanover and De Salaberry, also provide ambulance services. The remaining RMs rely on ambulance services provided by neighboring municipalities. Local fire and emergency medical services in the RMs of Macdonald, Franklin and Montcalm are provided by volunteer fire departments based out of Dominion City, St. Jean-Baptiste and Letellier.

The RMs are serviced by various RCMP detachments. Municipalities with no police detachments (RMs of Franklin and Montcalm) are provided police protection through other nearby RCMP detachments in Emerson, St. Pierre Jolys, and Morris. St-Pierre-Jolys and Niverville have their own ambulance, fire department and RCMP detachments.

Southern Health, the Regional Health Authority comprising the former South Eastman and Central Regional Health Authorities (RHAs), provides health and social services for the RMs within the RSA. South Eastman Health (which includes the RMs of Ritchot, Tache, Hanover, De Salaberry and Franklin) owns and operates one hospital in the RSA, located at St. Pierre-Jolys in the RM of De Salaberry. There are three personal care homes in the region, one associated with the regional hospital in St. Pierre-Jolys, and two other facilities in Grunthal (non-profit, faith-based institution) and St. Adolphe (privately owned). One home care site operates in Dominion

City. The primary health care centre in the region is located in Niverville. Family physicians are based in St. Pierre-Jolys. South Eastman is responsible for all community-based and emergency medical services provided within the region (South Eastman 2009). The Central Region, which comprises the RMs of Macdonald and Montcalm, operates a medical centre in La Salle and a public health centre in Sanford. In St. Jean Baptiste, health service sites include a public health centre, home care and a medical clinic (Southern Health 2010).

Roseau River First Nation

The main community (Roseau River Indian Reserve No. 2) is surrounded by a ring dike for flood protection. The main community is serviced by chlorinated running water delivered through the Letellier water system. The majority of houses on the Reserve receive piped water, although a small number either receive water from community wells or from individual wells, or have water trucked in to fill cisterns or barrels. The community has a sewage lagoon located outside of the ring dike for disposal. Within the community, the majority of houses have piped septic service, although some houses have individual septic fields and some have trucked septic service. The community has a landfill site located outside of the ring dike and garbage pickup and disposal services are provided to the residents.

Police protection in the community is provided by the Dakota Ojibway Police Service (DOPS), which has four constables on-Reserve. The nearest RCMP detachment is located in Emerson. Fire protection in the community is provided by a volunteer fire department that is serviced by a single fire truck. The RRAFN has an agreement to purchase fire-protection services from the RM of Franklin on an as-needed basis (Roseau River Watershed Plan 2007).

Health care at Roseau River is provided through the Ginew Wellness Centre, which offers a variety of health and wellness programs and services in cooperation with the First Nations and Inuit Health Branch of Health Canada. There is a community health representative and registered nurse on-Reserve.

6.4.8 Personal, Family and Economy

6.4.8.1 Population and Demographics

6.4.8.1.1 Population Distribution and Demographics

As shown in Table 6.4-4, it is estimated that total population within the RSA in 2011 was 220,813 permanent residents (the City of Winnipeg. 2006a–2006b; Statistics Canada. 2013a – 2013j), accounting for approximately 19% of Manitoba's total population (Statistics Canada 2013k). However, since census figures do not include non-permanent, seasonal workers, they do not reflect the number of actual people residing in the region.

Approximately 81% of people in the RSA (178,850) live in the communities of Fort Garry (68,095), St. Boniface (49,150) and St. Vital (61,650) within the city of Winnipeg (City of

Winnipeg 2006a-2006b); the remaining 19% are scattered throughout the various RMs (42,595), the town of Niverville (3,540), the village of St. Pierre Jolys (1,099) and the Roseau River First Nation Reserve (588) (Statistics Canada 2013a-2013j).

The nearest major metropolitan centre is the city of Winnipeg (649,995), a portion of which (discussed above) occurs within the RSA (Statistics Canada 2013l).

In the five-year period between 2006 and 2011, the population in the RSA has increased by 2.7% (the City of Winnipeg. 2006a–2006b; Statistics Canada. 2013a–2013j), whilst the Province grew by 5.2% in the same time-period (Statistics Canada 2013k).

Although the population in the RSA experienced relatively modest growth (2.7%) overall between 2006 and 2011 (Statistics Canada 2013a-2013j, the City of Winnipeg 2006a-2006b), the town of Niverville and the RM of Hanover increased by 43.7% and 18.2%, respectively (Statistics Canada 2013f; 2013c). Though current statistical data for Fort Garry, St. Boniface and St. Vital Wards are not yet available, it is estimated that they experience growth commensurate to other areas within the city of Winnipeg.

Table 6.4-4: Regional Study Area Population, Manitoba

Community	Population		
	2006	**2011**	**Percent**
Manitoba	***1,148,401***	***1,208,268***	***5.2***
RSA			
RM of De Salaberry	3349	3450	3.0
*Fort Garry	68095	68095	N/A
RM of Franklin	1768	1768	0.0
RM of Hanover	11871	14026	18.2
RM of MacDonald	5653	6280	11
RM of Montcalm	1317	1309	-0.6
Niverville	2464	3540	43.7
RM Ritchot	5051	5478	8.5
*St. Boniface	49150	49150	N/A
*St. Vital	61605	61605	N/A
St. Pierre Jolys	839	1099	31
RM of Tache	9083	10384	13.2
Roseau River First Nation Reserve	568	588	3.5
Total	**220,813**	**226,672**	**2.7**

*Note: All values from 2006 as more current data was not available.

Source: The City of Winnipeg. 2006a – 2006b; Statistics Canada. 2013a – 2013k.

6.4.8.1.2 Aboriginal Population

The Roseau River First Nation Reserve is located in the southern extent of the RSA. According to the 2011 Census, the population was 588 people. Aside from this First Nation, approximately 8% (17,915) of the total population of the RSA have identified themselves as Aboriginal (the City of Winnipeg 2006a-2006b; Statistics Canada 2013a-2013j). This is relatively low compared to the Province of Manitoba where 17% (195,895) of the total population identify themselves as Aboriginal (Statistics Canada 2013k). The majority of Aboriginal peoples, 14,070 (or 76%) within the RSA are Métis, while 4,125 (or 22%) claim a North American First Nation single identity (including Roseau River First Nation).

6.4.8.2 Employment

Participation, employment and unemployment statistics for each community and RM in the RSA are found in Table 6.4-5. As data relating to "total population aged 15 years and over by labour force status" is not available for Fort Garry, St. Boniface and St. Vital, employment data for the RSA (Table 6.4-5) is characterized independently from these communities.

The labour force in the rural areas that comprise the RSA (excluding the communities of Fort Garry, St. Boniface and St. Vital) is estimated at nearly 34,710 people (Statistics Canada 2013a-2013j), with a labour force participation rate of 74%, slightly higher than the provincial average of 67.3% (Statistics Canada 2013k). The unemployment rate in the economic region that encompasses the RSA is 44.6 (Statistics Canada 2013a-2013j), and is lower than the provincial rate of 6.2% (Statistics Canada 2013k).

6.4.8.3 Economy and Labour Force

The regional economy in the RSA is largely focused on healthcare and social assistance (12%), retail trade (11%) and manufacturing (8%) (the City of Winnipeg 2006a–2006b; Statistics Canada. 2013a–2013j). This is comparable to the provincial level where healthcare and social assistance (13%), retail trade (11%) and manufacturing (9%) also dominant employment (Statistics Canada 2013k). However, it should be noted that the inclusion of Fort Garry, St. Boniface and St. Vital, as densely populated city neighbourhoods, masks the relatively widespread participation in agriculture (10%) (Statistics Canada 2013a–2013j) in the rural communities of the RSA, through which the majority of the Project will traverse.

A large proportion of the labour force in the RMs of Hanover, Macdonald and De Salaberry are employed in agriculture/forestry/fishing/hunting. In 2011, the RM of Hanover had a higher proportion of individuals employed in manufacturing, construction, transportation and warehousing, and other services compared to other RMs. The RM of Macdonald had a higher proportion of individuals employed in retail trade and public administration compared to other RMs. In the RM of Tache, a higher proportion of individuals were employed in the professional, scientific and technical services, administrative and support, waste management and remediation services, educational services, health care services and public administration.

6.4.8.4 Education and Income

The education levels of the RSA population are approximately the same as the provincial average with respect to the completion of high school (28%) and the proportion of the population holding a trade certificate (9%) (City of Winnipeg 2006a–2006b; Statistics Canada 2013a–2013j). However, the proportion of the RSA population that holds a university degree, diploma or certificate (43%) is significantly higher than the provincial average of 24% (City of Winnipeg 2006a–2006b; Statistics Canada. 2013a–2013k).

Table 6.4-5: Labour Force Status in the Regional Study Area

Community	Labour Force Status							
	Total Population Aged 15 Years and Over by Labour Force Status	In the Labour Force	Employed	Unemployed	Not in the Labour Force	Participation Rate	Employment Rate	Unemploy-ment Rate
Manitoba	***946945***	***636835***	***597290***	***39550***	***310105***	***67.3***	***63.1***	***6.2***
RSA								
RM De Salaberry	2375	1775	1705	70	600	74.7	71.8	3.9
*Fort Garry	N/A	38640	36755	1885	17245	69.1	65.8	4.9
RM Franklin	1255	870	820	60	380	69.3	65.3	6.9
RM Hanover	9555	6845	6630	215	2705	71.6	69.4	3.1
RM MacDonald	4860	3640	3525	120	1220	74.9	72.5	3.3
RM Montcalm	1015	730	705	25	285	71.9	69.5	3.4
Niverville	2475	1890	1810	80	580	76.4	73.1	4.2
RM Ritchot	4300	3285	3155	130	1020	76.4	73.4	4.0
*St. Boniface	N/A	28415	27270	1150	11825	70.6	67.8	4.0
*St. Vital	N/A	35670	34110	1560	15050	70.3	67.2	4.4
St. Pierre Jolys	825	550	520	35	270	66.7	63.0	6.4
RM of Tache	7550	5935	5620	320	1730	77.5	73.4	5.4
Roseau River FN	390	150	90	60	245	38.5	23.1	4.0
Total Communities	**34710**	**128395**	**122715**	**5710**	**53155**	**70**	**66**	**4.4**

*Values rom 2006 used as 2011 data was not available

Source: The City of Winnipeg. 2006a-2006b; Statistics Canada. 2013a-2013k.

Table 6.4-6: Education Levels in the Regional Study Area

Community	Total Population Aged 15 Years and Over by Highest Certificate, Diploma or Degree	No Certificate, Diploma or Degree	High School Diploma or Equivalent	Apprenticeship or Trades Certificate or Diploma	College; CEGEP or Other Non-university Certificate or Diploma	University Certificate or Diploma Below Bachelor Level	University Certificate; Diploma or Degree at Bachelor Level or Above
Manitoba	***946940***	***237615***	***262500***	***89285***	***150445***	***38600***	***168495***
RM De Salaberry	2375	675	775	325	380	100	130
*Fort Garry	55885	8665	14720	3585	8260	3135	17520
RM Franklin	1255	485	255	185	170	75	80
RM Hanover	9550	3710	3055	885	1130	210	565
RM MacDonald	4860	765	1595	520	825	245	915
RM Montcalm	1015	250	310	165	125	45	120
Niverville	2475	640	605	215	515	100	400
RM Ritchot	4305	865	1400	500	835	170	535
*St. Boniface	41265	8650	11735	3955	7005	2000	7915
*St. Vital	50720	10210	14380	4705	8890	2425	10095
St. Pierre Jolys	825	225	180	75	170	45	130
RM of Tache	7660	1620	2150	1015	1535	230	1105
Roseau River FN	390	215	75	50	35	0	0
Total	**182580**	**36975**	**51235**	**16180**	**29875**	**8780**	**39510**

*Values from 2006 used as more current data was not available

Source: The City of Winnipeg. 2006a-2006b; Statistics Canada. 2013a-2013k.

Table 6.4-7: Total Income of Private Households

Community	Total Income of Private Households in 2010												Median After-Tax Household Income
	Household Total Income in 2010 of Private Households	Under $5,000	$5,000-$9,999	$10,000-$14,999	$15,000-$19,999	$20,000-$29,999	$30,000-$39,999	$40,000-$49,999	$50,000-$59,999	$60,000-$79,999	$80,000-$99,999	$100,000 and over	
Manitoba	***465805***	***13550***	***11410***	***14335***	***27040***	***44110***	***47695***	***45370***	***39855***	***68350***	***51095***	***102985***	***50392***
RSA													
RM De Salaberry	1115	20	0	35	25	55	105	160	170	210	105	220	50133
*Fort Garry	26170	N/A	1355	N/A	1845	2245	2565	2230	2190	3915	3065	6765	63059
RM Franklin	635	40	0	20	40	40	70	100	45	140	75	45	45784
RM Hanover	3950	25	35	80	135	190	410	485	440	795	725	625	56687
RM MacDonald	2040	10	40	0	40	110	80	90	110	335	295	355	79528
RM Montcalm	455	15	0	0	0	0	35	40	80	110	50	50	50407
Niverville	1140	15	10	0	25	60	65	115	160	220	190	270	60887
RM Ritchot	1855	10	0	70	45	35	70	165	90	320	260	775	73797
*St. Boniface	20275	N/A	785	N/A	N/A	2050	2095	1875	1705	3190	2395	4365	58840
*St. Vital	25450	N/A	975	N/A	2275	2600	2990	2670	2195	3970	2900	4875	55363
St. Pierre Jolys	425	0	0	0	15	65	50	40	45	105	20	55	47065
RM of Tache	3285	40	50	20	70	130	215	265	180	600	615	1105	71053
Roseau River FN	165	0	0	0	0	0	0	0	0	0	0	0	17321
Total	**86960**	**175**	**3250**	**225**	**4515**	**7580**	**8750**	**8235**	**7410**	**13910**	**10695**	**19505**	**56687**

*Values from 2006 used as 2011 data was not available

Source: The City of Winnipeg. 2006a-2006b; Statistics Canada. 2013a-2013k.

The median household income level within the RSA is $56,025 (Table 6.4-7), above the provincial level of $50,392 (the City of Winnipeg. 2006a-2006b; Statistics Canada 2013a-2013j). The income level in the RSA is generally reflective of the distribution of the labour force across industries as shown in Table 6.4-7 above. Relatively high proportions of the labour force in both the Province and the RSA are engaged in the comparatively low wage sectors of retail and manufacturing (the City of Winnipeg 2006a-2006b; Statistics Canada 2013a-2013j).

6.4.8.5 Agricultural Economy

Agriculture is a key driver in the rural economy, contributing directly and indirectly between 4.4% and 4.8% to the province's GDP (Manitoba Industry Intelligence 2011). The 2011 Census indicates that there were 15,877 census farms in Manitoba, a 16.7% decrease from 2006. The number of farm operators also declined by 16.2% between 2006 and 2011. The total farm area decreased 5.5% to 18 million acres between 2006 and 2011. While the total farm area in Manitoba decreased, the average farm size increased to 1,135 acres in 2011, up from 1,001 acres in 2006. Of the total farm area, 59.6% was cropland in 2011 down slightly from 60.9% in 2006 (2011 Census of Agriculture, Statistics Canada).

Almost all the cropland in the province was reported as field crops and hay in 2011. Field crops (including potatoes) accounted for 82.9% of the total cropland compared to 79.8% in 2006. The percentage of hay decreased from 20.1% in 2006 to 17.0% in 2011. An increase in prices for cash crops and declining beef cattle and pig numbers led to a shift from forages and crops traditionally used for feed to more profitable crops (2011 Census of Agriculture, Statistics Canada).

In 2011, Manitoba reported 2.9 million pigs, a decrease of 2.8% from 2006, but still the third largest pig herd in Canada. The total number of cattle decreased 23.0% to 1.2 million head since 2006. The total number of beef cattle kept for breeding purposes (cows and heifers) decreased by 23.9% in 2011 to 550,642 head (2011 Census of Agriculture, Statistics Canada).

In Manitoba, there were 180 farms that were certified organic and/or were in transitional production for 2011. This represented 1.1% of all farms in Manitoba. Organic farms were predominantly certified in field crops and hay, representing 88.3% of the total (2011 Census of Agriculture, Statistics Canada).

6.4.9 Human Health, Community and Aesthetics

6.4.9.1 Health Status

Health services in Manitoba have been divided into regions through the establishment of Regional Health Authorities (RHAs). The primary responsibility for the RHA is to ensure that all residents of a region have equitable access to health services. Communities within the RSA are within two separate RHAs as follows: Winnipeg and Southern Health (comprising South Eastman and Central Regions).

The Winnipeg RHA is responsible for providing health care to more than 700,000 people living in the city of Winnipeg (Winnipeg RHA, 2010). Portions of South Winnipeg, the neighbourhoods of Fort Garry and St. Vital, are included in the Project RSA.

Within the Southern Region RHA, South Eastman is a mid-size rural regional health authority responsible for providing health services to more than 65,000 people (South Eastman RHA, 2009). Municipalities within the RSA that are part of South Eastman include: Ritchot, Tache, Hanover, De Salaberry and Franklin. The Central Region RHA provides health services to over 104,600 people. Only the Central Region municipalities of Macdonald and Montcalm are found within the RSA.

As an indicator of overall health in the RSA, an overview of RHA and provincial health data in terms of infant mortality and life expectancy is provided (Table 6.4-8). Infant mortality and life expectancy are widely used indicators to measure the well-being and health of a population respectively. In the Province of Manitoba, the infant mortality rate is 5.5 per 1,000 live births. In the RHAs within the Project RSA, this rate varies from 4.4 in South Eastman to 6.1 in the Central Region RHA. In terms of life expectancy, in the Province as a whole, life expectancy at birth is 78.9 years. The Winnipeg, South Eastman and Central Region RHAs all had higher life expectancies at birth.

Table 6.4-8: Average Infant Mortality and Life Expectancy in Regional Study Area

Regional Health Authority (RHA)	Infant Mortality (per 1,000 live births of children under 1 year of age)	Life Expectancy at Birth (in years)
Winnipeg RHA	5.0	79.3
South Eastman	4.4	81.0
Central	6.1	80.1
Province of Manitoba	5.5	78.9

Source: Manitoba Health Profiles 2010

Premature mortality rates (PMR[14]) is another indicator of overall health and well-being. The average PMR for RHAs in the RSA was compared to the Province of Manitoba based on data

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[14] PMR is an indicator of the rate of early death (i.e., death before average life expectancy) in a population and is highly associated with morbidity and self-rated health, as well as with socio-economic risk factors for poor health. In Manitoba, premature mortality rates are calculated as the number of deaths that occur before age 75 per 1,000 residents.

over a 10-year period (1996-2005). The average PMR in the Winnipeg RHA was 3.3 per 1,000 people. The average PMR for South Eastman was 2.6 per 1,000 people (South Eastman Health 2010). The Manitoba average over this same period was 3.4 per 1,000 people (Manitoba Centre for Health Policy 2009). The PMR for the Central Region was 2.8 per 1,000 people (Regional Health Central, 2010).

The top five causes of mortality in the Winnipeg RHA according to the Manitoba Health Centre for Health Policy (2009) were circulatory (34%), cancer (28%), respiratory (8%), injury (6%) and endocrine and metabolic (5%). In terms of health status, over 60% of Winnipeg residents reported being in “excellent” or “very good” health (self-rated health). The leading causes of death across southern Manitoba populations in South Eastman were circulatory (34%), cancer (27%), respiratory (8%), injury (6%), and endocrine and metabolism (6%). In South Eastman, 60% of residents reported their health status as being very good or excellent (self-rated). The leading causes of death in the Central Region were circulatory (32%), cancers (27%), respiratory (7%) and endocrine and nutritional disorders (5%). In the Central Region, the percentage or residents who self-rated their physical health as very good or excellent was 61% (Regional Health Central 2010).

As a result of ongoing population growth in South Eastman, all programs and health services are experiencing steadily increasing volumes (South Eastman Health 2010). In the Central Region, a growing population also represents an opportunity and a challenge to extend the reach, build capacity and enhance programs in the health system across the region (Regional Health Central 2010).

6.4.9.1.1 Aboriginal Health

Within the Central Region RHA, 2006 Census data revealed that 11.3% of residents identified as Aboriginal. The Aboriginal population in the region, which includes the Roseau River First Nation, appeared to have grown but remains a smaller proportion of the regional population. The population structure is primarily young meaning that this population would have specific health needs due to higher birth rates, and higher rates of childhood illnesses and chronic diseases, such as diabetes (Regional Health Central 2010).

Within the Central Region RHA, 2006 Census data revealed that 11.3% of residents identified as Aboriginal. The Aboriginal population in the region, which includes the Roseau River First Nation, appeared to have grown but remains a smaller proportion of the regional population. The population, with the majority being young, means that this population has specific health needs such as higher birth rates, and higher rates of childhood illnesses, and very high rates of chronic diseases, such as diabetes (Regional Health Central 2010).

6.4.9.2 Community Life

The following provides a general description of the various community facilities and amenities available in the city of Winnipeg, the Town of Niverville, the Village of St. Pierre-Jolys and the six RMs within the RSA.

The city of Winnipeg is home to a 24-hour airport and major rail and road systems that connect in all directions. Strong sectors in the economy include the grain industry, financial and insurance sectors, secondary manufacturing, major food and beverage processing, and a large aerospace centre. Major attractions include the numerous parks and green spaces, a host of cultural events and festivals, a rich arts and entertainment scene, numerous restaurants and fine dining venues, upscale specialty neighbourhood areas, and professional sporting events (Partnership of the Manitoba Capital Region 2012).

The communities within the RM of Macdonald offer many cultural and recreational activities. The La Salle River provides many picturesque river front properties and recreation opportunities throughout the municipality. The RM offers modern services and amenities for residents and businesses. Bigger centres such as Oak Bluff, Sanford and La Salle offer schools and many recreational and community facilities like curling clubs, community clubs, and churches (Partnership of the Manitoba Capital Region 2012). Opportunities for residents are abundant, evident by such groups as the 4-H Club, various sports clubs, the Canadian Legion, Knights of Columbus, school organizations and many other clubs (RM of Macdonald Community Profile 2006). Other events include an annual golf and slo-pitch tournaments in the summer in La Salle, including Kingswood Golf and Country Club. Many kilometres of groomed winter trails throughout the municipality, as well as the La Salle River, provide many opportunities for canoeing, skiing and snowmobiling (Partnership of the Manitoba Capital Region 2012).

There are a number of local attractions in the RM of Ritchot, including Le Clos Flueri Team Room in Ste. Agathe. The RM has a number of events and festivals including Cheyenne Days, the St. Adolphe Winter Carnival, and the Festival of the Stars in Ile des Chens. There are also excellent fishing and hunting opportunities throughout the region (RM of Richot Community Profile, 2006). Traditional river lot settlement pattern is prevalent in the municipality. Duff Roblin Provincial Park, located at the mouth of the Red River Floodway, is considered a regional asset within the RM. Major transportation corridors within the RM include PTH 75, PTH 59 and PR 200. PTH 75, also known as Lord Selkirk Highway, is a historic travel route travelling south from Winnipeg to Emerson, following the course of the Red River, a historical route of early settlers.

With the TransCanada Highway running through the municipality, there are many transportation companies established within the RM of Tache. Given its proximity to Winnipeg, larger centres such as Landmark and Lorette offer many schools, churches, and commercial services. Lorette, the largest centre, has many services, with four schools, several grocery stores, a medical centre, a Credit Union and the Dawson Trail Motor Inn and Restaurant. The municipality is home to many community organizations, with a curling rink, arena, several baseball diamonds, a football field, and outdoor hockey rinks to meet community recreation needs. Other attractions include Notre Dame de Lorette Church, in the community of Lorette, and the Site Historique Monseigneur Taché Historic Site located in Ste. Genevieve. The municipality offers may winter activities, including the annual winter carnival at the Lorette arena and the summer Friendship Festival in Landmark (Partnership of the Manitoba Capital Region 2012).

The RM of Hanover has extensive and well developed transportation infrastructure with various courier and transport services available in the area. The RM of Hanover is a full-service community which hosts phone, internet and broadband services throughout the region. The various community centres play host to numerous events throughout the year. Ranch rodeos, and hockey and baseball tournaments keep residents and visitors busy during summer and winter. The community of Grunthal offers a wide variety of recreational facilities for many sporting and recreational uses. Facilities include a recreation centre, an arena and Grunthal Centennial Park. The Hanover Agricultural Society Fair is held annually in Grunthal. The Kleefeld Recreation Association offers numerous special events, including youth soccer, Kleefeld Honey Festival, farmer's market, church youth groups and a cross-country skiing group. Recreational facilities in Kleefeld include: outdoor skating rink, skate park, picnic shelters, stage, playground, tennis courts, beach volleyball court, soccer fields, baseball diamonds, recreation centre with kitchen and canteen, and walking paths. The New Bothwell and Area Community Centre also offers special events and programming, including baseball, outdoor recreation hockey, New Bothwell summer fair, wine and cheese festival, church picnic and a winter carnival. Recreation facilities include: baseball diamonds, skateboard park, picnic shelter and canteen, play structures, outdoor rink, recreation centre, soccer field and beach volleyball court (RM of Hanover, http://www.hanovermb.ca/).

The RM of Franklin receives most provincial and local radio stations, most television signals via Winnipeg, local area and Winnipeg newspapers, and also has dial-up and high-speed Internet access. There are some areas throughout the municipality where cell phone service is not available. Dominion City offers many services to area residents including a business sector, hotel, restaurant, grocery and hardware stores, contractors, a grain elevator, school and recreation facilities (RM of Franklin Community Profile n.d.). Community facilities include an indoor curling rink, hockey arena, and heated pool in Dominion City and skating rinks in Roseau River and Ridgeville. The Roseau River Park is located on PTH 59 at the community of Roseau River. The Franklin Museum in Dominion City and the Swinging Cable Bridge over the Roseau River near Dominion City provide examples of the rich historical attractions in this centennial community. The RM has many festivals and events including the annual Roseau River Canoe Derby, the Roseau River Horse Show, Elk's Fair Day, the Dominion City Carnival, and the Roseau River Pow Wow (RM of Franklin Community Profile n.d.).

The RM of Montcalm receives provincial and local radio stations, television signals via Winnipeg, local area and Winnipeg newspapers, and also has dial-up and high-speed Internet access. Cell phone service is available throughout most of the municipality. Community facilities include an indoor curling rink, hockey arena, park and centennial hall in St. Jean Baptiste, a recreation community hall in St. Joseph, and an arena, park and community hall in Letellier. The

St. Joseph Museum exemplifies the rich agricultural history of the community. The museum features a historical village, agricultural village, a tourism center and a campground. Other festivals and events include the Montcalm Heritage Festival, held on the St. Joseph Museum grounds (RM of Montcalm, http://www.rmofmontcalm.com/).

6.4.9.2.1 Roseau River First Nation

Roseau River First Nation children attend the Ginew School, which is operated by the First Nation and provides KS4 education. Some of the First Nation children also attend schools that are off-Reserve in nearby communities. The First Nation has its own radio station at 100.5 FM and receives most southern Manitoba radio stations, television feeds from Winnipeg, and also has dial-up and high-speed Internet access. Private telephone exchange is available on the Reserve and buried cable services have been extended to some of the newer homes. Community services and other on-Reserve facilities include an administration office, community hall, government office, an activity centre, indoor skating rink, baseball diamond, and a training centre. The Roseau River Pow Wow is held every summer and is an extremely popular and important cultural event for the community (Roseau River Watershed Plan 2007).

6.4.9.3 Aesthetics

The aesthetics of the Project RSA vary with the topography and vegetation of the natural landscape, as well as the degree of human activity associated with settlement patterns and with consumptive and non-consumptive land/resource uses beyond communities. Manitoba's regions outside of Winnipeg encompassed within the RSA include the Pembina Valley Region and Eastern Region (Manitoba Regional Tourism Network http://www.traveltomanitoba.ca/).

The Pembina Valley Region stretches from the Red River west to the Manitoba Escarpment and from Highway 2 south to the US border, an area rich in farmland and pioneering history. The Eastern Region transitions from farmland into boreal forest and presents opportunities for agri-tourism, eco-tourism, canoeing, fishing and hunting. The culture in the area is as varied as the landscape with a rich history (Manitoba Regional Tourism Network Website). For portions of these two regions that fall within the RSA, agriculture is the major industry. Farmers grow a wide range of crops and livestock production is also prominent.

The land within the Project RSA consists primarily of agricultural properties interspersed with rural residences. The land is flat with some trees. Woodland cover is sparse with occasional small woodlots and shrub patches as well as planted hedgerows and shelter belts. Hedge rows and shelter belts are typically found around farms and residential properties. Areas of mixed woodland are also present in the area WMAs and St. Malo Provincial Park. Ribbons of tree cover follow along the major rivers and creeks flowing through the RSA. Communication towers, hydro transmission and distribution lines, and wind turbines are visible entities found across the landscape.

6.4.10 Heritage Resources

Heritage resources were characterized for the RSA consisting of locations of previously recorded archaeological sites, registered century farms and a compiled list of municipally and provincially designated sites. A list of known cemeteries was also compiled. There is the potential for additional active and/or abandoned graveyards to be present within the Project Area.

6.4.10.1 Historical Summary

The cultural chronology of Manitoba is generally divided into two periods, Precontact and Historic (Table 6.4-9). Each is further divided into Early, Middle and Late. The Precontact Period dates from ca. 12,000 to 300 years ago and relates to the time when First Nation hunter/gatherer groups moved into the area as Lake Agassiz receded, bringing with them a plains-adapted subsistence primarily based on bison hunting. Through time, woodland adapted groups from the south and southeast utilized the area and either displaced or merged their cultural traditions with earlier groups. Cultural traditions, history and spirituality were passed to subsequent generations through the spoken word or possibly by rock paintings (pictographs), alignments (petroforms) and figures cut into rock faces (petroglyphs).

The Historic Period dates after ca. A.D 1700, when European and Canadian fur traders and explorers entered the area to trade goods for furs that could be exported to Europe. Oral histories were augmented with written records such as diaries, letters, trade post journals and annual reports.

The earliest Manitoba inhabitants were probably small groups of hunters who followed large game into the southwest corner of the province. The lithic technology of these early hunters would have consisted of large spears, scrapers, knives and adzes. Preferred kill sites would have consisted of settings where animals could be channeled into an area that restricted the speed at which they could escape. Narrow river or creek channels or wet marshy areas where the animals could get bogged down would have been favoured hunting spots within the Project Area.

The Middle Precontact Period corresponds to the period of warmer and drier environmental conditions that created a northerly expansion of the grasslands and an expansion in the bison range further east and north. Prior to this event, the wooded areas of the south central portion of the province were probably only used as wintering areas for small groups of bison. The expansion of the bison range could have resulted in a longer site occupation by groups who, prior to the warmer and drier conditions, only inhabited the southern portion of Manitoba during certain times of the year during their seasonal round. In addition, the increased number of people could also be the result of population pressures on the plains as a result of over hunting causing people to not only diversify their resources but also move to new areas where such resources were more reliable. Hunters and gatherers also began diversifying the resources they used during this period as evidenced by a wider variety of faunal remains at excavated sites.

Table 6.4-9: Suggested Archaeological Time Periods in Manitoba Based on Technology

Archaeological Period	Technology	
	Container Type	Food Procurement
Late Historic Period (ca. 143 – 80 B.P.) (A.D. 1870 – 1940)	Porcelain Tableware Earthenware Dinnerware Stoneware Storage Jars Glass Sealers Tin Cans	Repeating Rifles Automatic Shotguns Animal Drawn Agricultural Implements Gas/Diesel Farm Machinery
Middle Historic Period (ca. 192 – 143 B.P.) (A.D. 1821 – 1870)	Earthenware Dinnerware Stoneware Storage Jars Glass Bottles/Jars Copper Pots/Kettles	Breach Loading Rifles/Shotguns Percussion Cap Muskets
Early Historic Period (ca. 300 – 192 B.P.) (A.D. 1700 – 1821)	Copper Pots/Kettles	Flintlock Muskets/Shotguns Metal Traps Metal Projectile Points Metal Knives/Axes
Late Precontact Period (ca. 2500 - 300 B.P.)	Clay vessels: Selkirk (Late Woodland) Blackduck (Middle Woodland) Rainy River Composite (Middle Woodland) Laurel (Early Woodland)	Bow and Arrow Bone Harpoons Nets Projectile Points Side-notched Points Eastern and Plains Triangular
Middle Precontact Period (ca. 6500 - 2500 B.P.)	Fiber baskets/Bags Animal Viscera/Hide	Atlatl Bone Harpoons Nets/Fishing Weirs Oxbow Corner-notched Points McKean Lanceolate Points Pelican Lake Points Old Copper Points/Adzes
Early Precontact Period (ca. 9500 – 6500 B.P.)	Fiber Baskets/Bags Animal Viscera/Hide	Spears/Bone Harpoons Lanceolate Projectile Points Trihedral Adzes Agate Basin Logan Creek Late Sisters Hill Plano

The Middle Precontact Period is characterized by use of the spearthrower or atlatl, which may have diffused into the plains from southeastern United States its use can be identified in the archaeological record by a change from stemmed to notched projectile points. Copper tools such as points and adzes, were also used during this period but are only rarely found.

The most frequently found Precontact Period sites in Manitoba date to the Late Precontact Period. During this time the diversification of resources continued and local resource users combined bison and medium to small game hunting with fishing and the gathering of available fruit and plants as their main subsistence. Habitation sites tended to be more permanent where seasonal resources were plentiful, such as at the junction of the Red and Rat rivers, the junction of the Red and Assiniboine rivers, and in the Lockport area.

Pottery making marks the boundary between the Middle and Late Precontact periods. Pottery was either brought into Manitoba by groups migrating from eastern Canada and/or the south central United States or the technique of pottery manufacturing was transplanted into Manitoba through contacts with these groups. This period is also characterized by adoption of the bow and arrow, and the associated smaller side-notched points, and an increase in interaction with outside groups through trade.

There are three basic pottery styles that were used by cultural groups in the immediate Project area: Laurel, Blackduck, and the Selkirk composite. Recently, the Rainy River Complex has been identified within the Blackduck style and is based on ceramic styles recovered from excavations at the Canadian Museum for Human Rights.

Stone tools associated with the Late Precontact Period include small triangular and side-notched projectile points, a variety of stone and bone scraping tools, ovate knives, stone drills and smoking pipes. Shell paint dishes, antler end-scraper handles, beaver tooth gouges, bone harpoons, scapula hoes, and bone awls and needles were also used. Personal ornaments were made from bone and copper. Copper was also used to make tools and personal adornment.

Groups known as Besant and Sonota, although more plains adapted, could have incorporated the lower Red River region in their seasonal round. Both groups were primarily bison hunters and relied on communal hunts using traps and pounds or by stampeding them over river banks.

The burying of the dead in linear or circular mounds was a tradition that was extensively practiced by Late Precontact Period cultures.

In the Early Historic Period, members of the La Verendrye expedition were probably the first Euro-Canadians in the Project Area when they arrived in the early 1730s. Maps from this period identify the Cree and Assiniboine as occupying the study region. In 1734, the La Verendryes established a post on the Red River near present-day Selkirk and, for several years thereafter, the La Verendryes frequently used the Roseau River, also known as the Reed River, as a travel route between the Red River and Fort St. Charles on the Lake of the Woods. This route was shown to the French by the local First Nation groups and was an alternative to the Winnipeg River. La Verendrye's nephew, Christophe Dufrost Le Jemeraye, succumbed to disease when he was travelling along this route on May 10, 1736. He apparently was buried somewhere near the junction of the Red and Roseau rivers.

The first fur trade post constructed in the immediate area was that of the North West Company built by Charles Chaboillez in 1796 just north of the confluence of the Red and Rat rivers. Chaboillez relocated the post to the mouth of the Pembina River south of the Project Area in 1797.

The Middle Historic Period correlates with the merger of the North West and Hudson's Bay companies and the expansion of the Red River Settlement. Throughout this period, homestead settlement expanded along the Red and Rat rivers. These homesteads were predominantly Métis families who relocated from the Parish St. Boniface in the Red River Settlement. They generally constructed log dwellings in the Red River frame style with log outbuildings. The farm buildings were situated on the upper river terrace parallel to the river.

During the Late Historic Period, the river lots along the Red River continued to be settled by Métis families and French Quebec homestead settlers. The Mennonite West Reserve was established in 1874 and soon villages were developed that frequently consisted of a single street about half a mile long, with house/barns lining one or both sides of the street.

Several cart trails were established in the Project Area during the period between ca. 1870 and ca. 1880. Most of these were on elevated sections of land and were no doubt originally used by First Nation groups prior to the 1700s. The major trails in the Project Area were the Dawson Trail in the north portion of the Project Area, a small section of the cart trail from Fort Garry to Pembina along the west bank of the Red River near Letellier, the Crow Wing Trail along the east side of the Red River, Ste. Anne's Road, a trail identified as the "Cart Trail to Spruce Island", and two unnamed trails identified as Public Road 463 and Public Road 464. The unnamed trails possibly relate to trails that connected the East Mennonite Reserve with present-day Ile des Chênes, originally known as Oak Island.

The closest First Nation reserve to the Project Area is Roseau River Anishinabe First Nation Reserve, which was created after signing of Treaty 1 at Lower Fort Garry in 1871. The reserve consists of two parcels of land that make up a total of 3,066 ha. The largest piece of land, approximately 2,135 ha, is located 4 km east of PTH 75, adjacent to the Red River on PR 20, and the other 930 ha, known as Roseau River Rapids, located on the Roseau River, 5 km east of PR 218 and 4 km north of PR 201.

The Peguis Reserve, although located 190 km north of Winnipeg MB, has traditional land use ties within the PDA, LAA and RSA through their historical connection to the lower Red River region prior to the early 1900s in general, and with Chief Peguis and his followers during the *ca*. A.D. 1790s to *ca*. 1860s period in particular.

6.4.10.2 Previously Recorded and Existing Sites

Heritage resource sites located within the RSA include the following: archaeological sites (i.e., campsites, workshop, burial, uninterpreted, isolated find); permanent settlement (1); structural remnants (3); farmstead artifactual sites (12); fur trade post (1); trail remnants (29); century farms (114); cemeteries (40); municipal designated sites (10); provincial designated site (1); and a provincial plaque (1) (Heritage Resource Branch Database).

Lanceolate projectile points diagnostic of the Plano people have been recovered from along the east bank of the Red River near Ste. Agathe. In addition, projectile points diagnostic of the Late Sisters Hills and Logan Creek styles have been collected from cultivated fields between the Red and Rat rivers.

Three archaeological sites and three sites where bison collagen has been collected and dated have been reported along the Red River between the junction of the Red and Assiniboine rivers and the Canada-United States border. Collectively, these sites date from 2,235 to 5,570 years ago. One of the archaeological sites, located along the east bank of the Red River south of its confluence with the Rat River, was a bison kill and butchering site found between 3.0 and 4.0 m below the surface. The upper portion of the site had been cultivated and the site was recorded 180 m away from the riverbank. Oxbow projectile points have also been recovered from an agricultural field in the Arnaud area.

Several sites with Laurel pottery have been recorded along the Red River north and west of the Project Area including a burial in the Normand Park area of south St. Vital. The burial dated approximately 2,000 years ago. An eroded hearth with associated Laurel pottery was recorded along the Red River in the St. Adolphe area. The site materials were recorded at a depth of over 1.0 m below the ground surface. Several Blackduck sites and one Selkirk period site have also been recorded along the Red River. However, most of the assemblages were small and were suggestive of temporary camp sites rather than long-term occupations.

A site recorded in a cultivated field on the east side of the Marais River south of Letellier contained a Besant point.

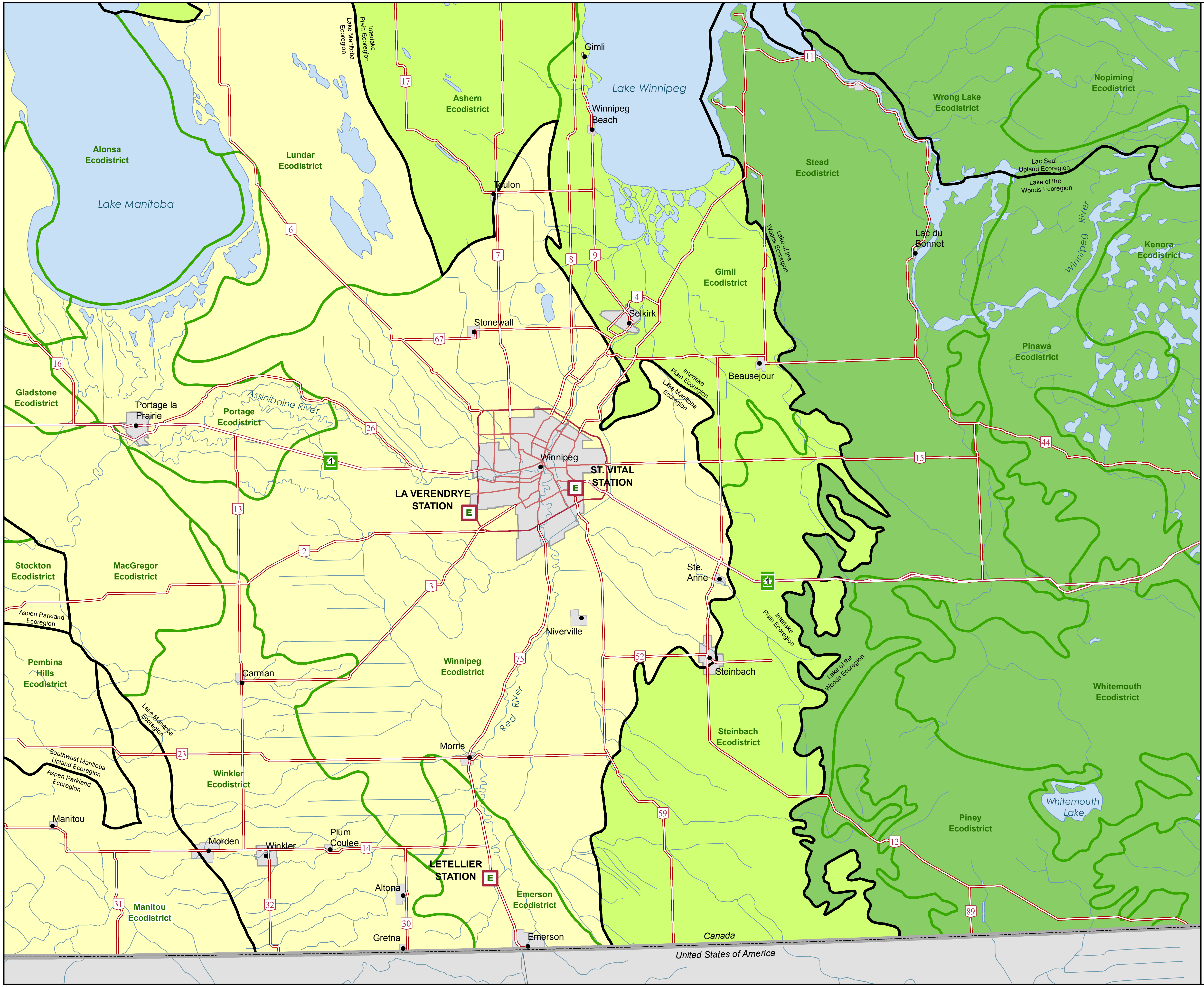
One burial mound, possibly dating to the Late Precontact period was recorded northwest of Ginew on the east bank of the Roseau River. This site has been destroyed by unlawful excavation.

A historic period burial was also recorded east of Letellier but only a few scattered and highly fragmented human remains and artifacts including beads, copper fragments and shell fragments were recovered.

The location of Chaboillez's post was tentatively identified on the east bank of the Red River north of the mouth of the Rat River. A number of log structures built during the late 1860s have been recorded along the Red River west of the proposed alternative routes. One of the largest homestead sites recorded is the Delorme House on the west bank of the river in the St. Adolphe area. The Red River frame house, now situated in St. Norbert Park, was built in the early 1860s by the Pierre Delorme family. This site serves as an example of the types of homestead settlements that stood along the Red, Seine and Rat rivers during the Middle and Late Historic periods.

Manitoba Hydro

St. Vital Transmission Complex



Project Infrastructure

- E Electrical Station

Terrestrial Ecoregions, Ecozones and Ecodistricts

- 🟩 Boreal Plain Ecozone
- 🟩 Boreal Shield Ecozone
- 🟨 Prairie Ecozone
- ▭ Ecoregion
- ▭ Ecodistrict

Landbase

- 1 Trans Canada
- 20 Provincial Highway
- — Provincial Road
- ▭ City / Town

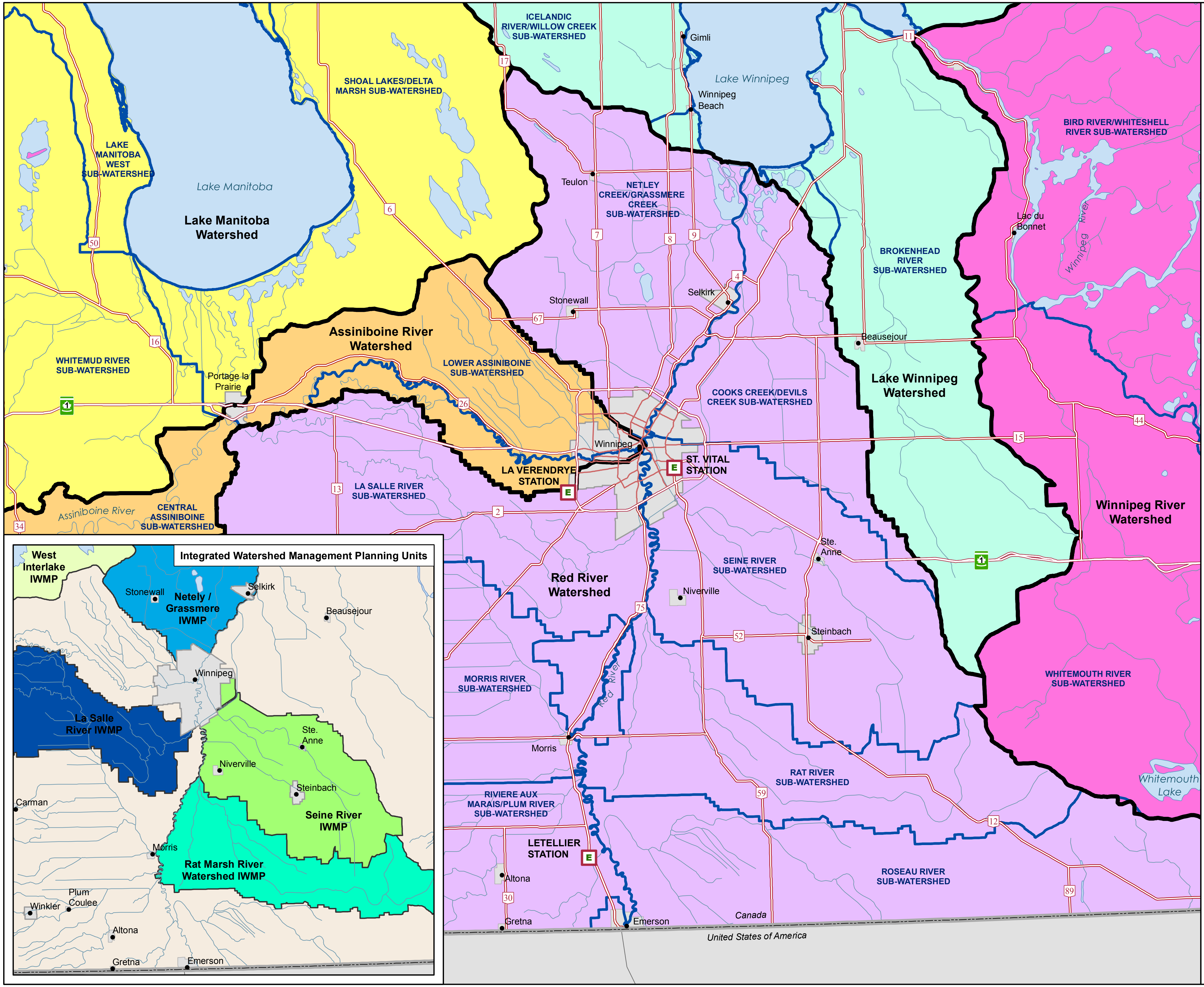
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 27, 2014

N

0 10 20 Kilometres
0 10 20 Miles
1:750,000

Terrestrial Ecoregions, Ecozones and Ecodistricts

Map 6-1



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

E Electrical Station

Watersheds and Sub-watersheds

🟧 Assiniboine River Watershed
🟨 Lake Manitoba Watershed
🟩 Lake Winnipeg Watershed
🟪 Red River Watershed
🟪 Winnipeg River Watershed
☐ Sub-watershed

Integrated Watershed Management Planning Units (IWMP)

🟦 La Salle River
🟦 Netely / Grassmere
🟩 Rat Marsh River Watershed
🟩 Seine River
🟩 West Interlake

Landbase

● Community
1 Trans Canada
20 Provincial Highway
⬜ City / Town

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 27, 2014

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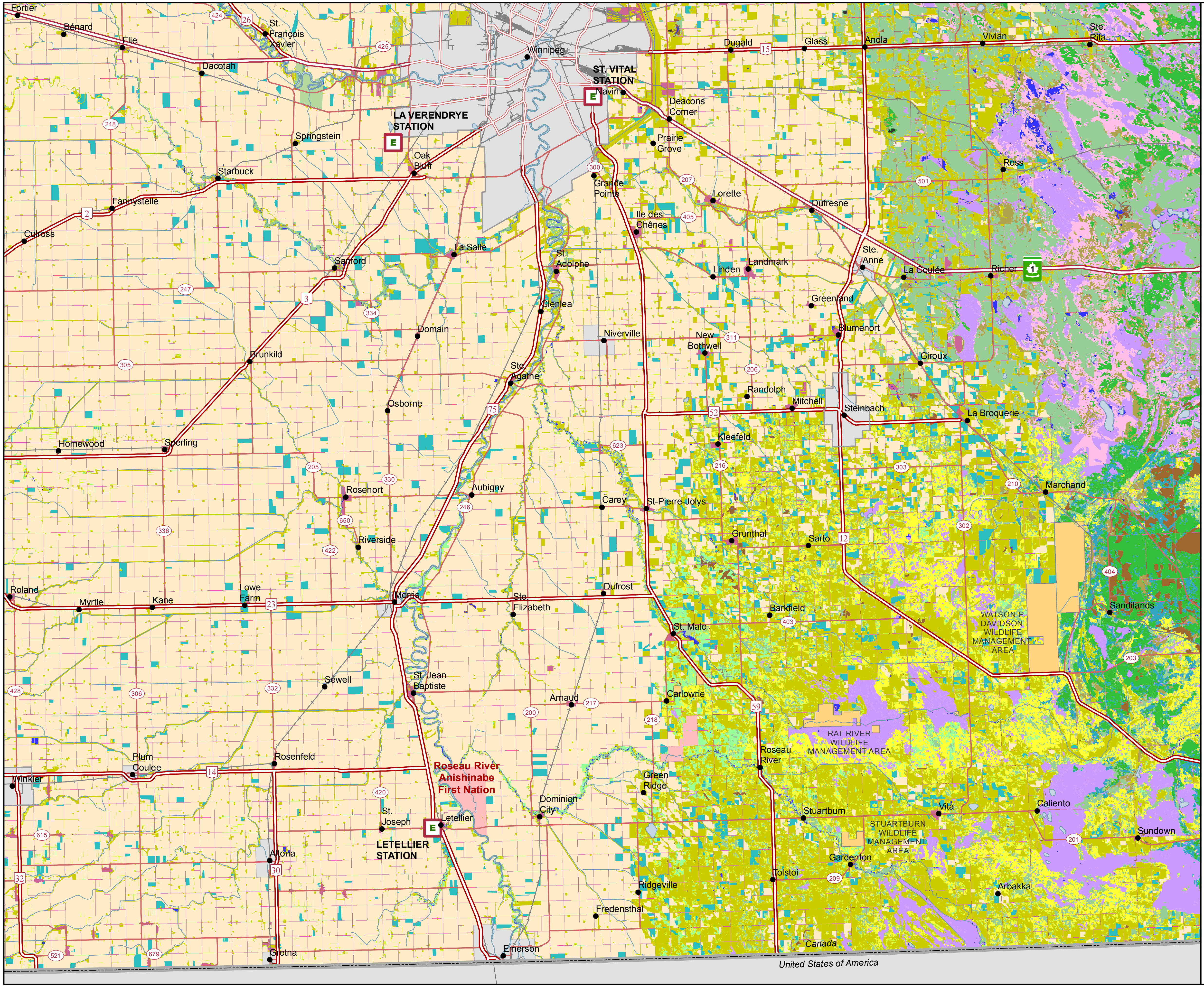
Watersheds and Sub-watersheds

Map 6-2



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- E Electrical Station

Land Cover Classification

- ■ Annual Cropland
- ■ Barren
- ■ Broadleaf Dense
- ■ Broadleaf Open
- ■ Broadleaf Sparse
- ■ Coniferous Dense
- ■ Coniferous Forest
- ■ Coniferous Open
- ■ Coniferous Sparse
- ■ Deciduous Forest
- ■ Developed
- ■ Exposed Land
- ■ Grassland
- ■ Herb
- ■ Mixed Forest
- ■ Mixedwood Dense
- ■ Mixedwood Open
- ■ Mixedwood Sparse
- ■ Perennial Cropland and Pasture
- ■ Rock/Rubble
- ■ Shadow
- ■ Shrub Low
- ■ Shrub Tall
- ■ Shrubland
- ■ Water
- ■ Wetland
- ■ Wetland - Herb
- ■ Wetland - Treed

Landbase

- ● Community
- 1 Trans Canada
- 20 Provincial Highway
- — Provincial Road
- ┼ Railway
- ■ City / Town
- ■ First Nation
- ■ Provincial Park
- ■ Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 27, 2014

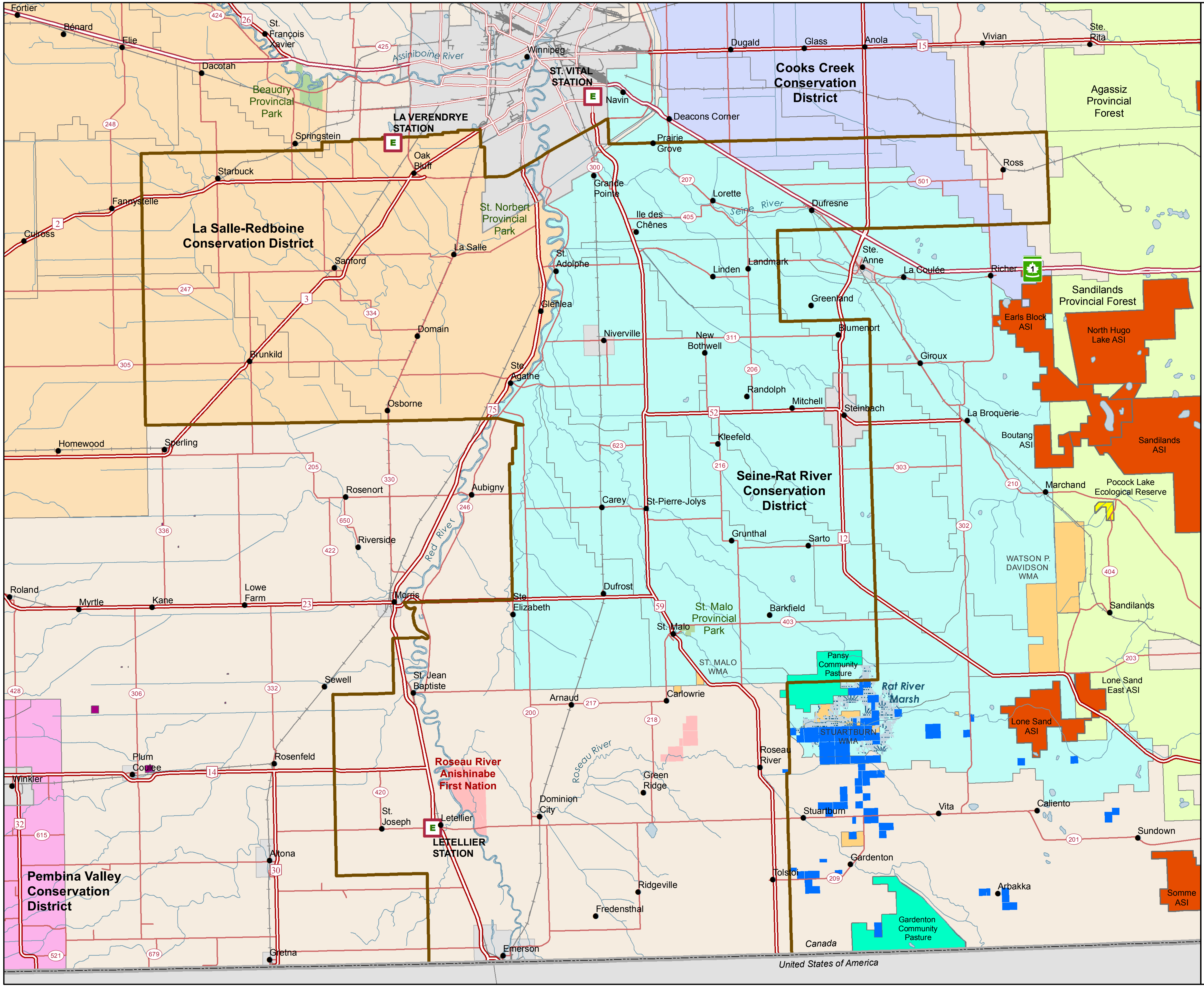
N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Land Cover Classification

Map 6-3



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- E Electrical Station
- ▭ Socio-economic Regional Study Area

Conservation Districts

- 🟦 Cooks Creek
- 🟧 La Salle-Redboine
- 🟪 Pembina Valley
- 🟦 Seine-Rat River

Protected Areas

- 🟩 Provincial Park
- 🟨 Ecological Reserve
- 🟪 Wildlife Refuge
- 🟦 Private Land
- 🟩 Community Pastures
- 🟥 Areas of Special Interest
- 🟥 First Nation
- ▨ Marsh
- 🟧 Wildlife Management Area
- 🟩 Provincial Forest

Landbase

- ● Community
- 1 Trans Canada
- 20 Provincial Highway
- — Provincial Road
- ┼ Railway
- ⬜ City / Town

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 27, 2014

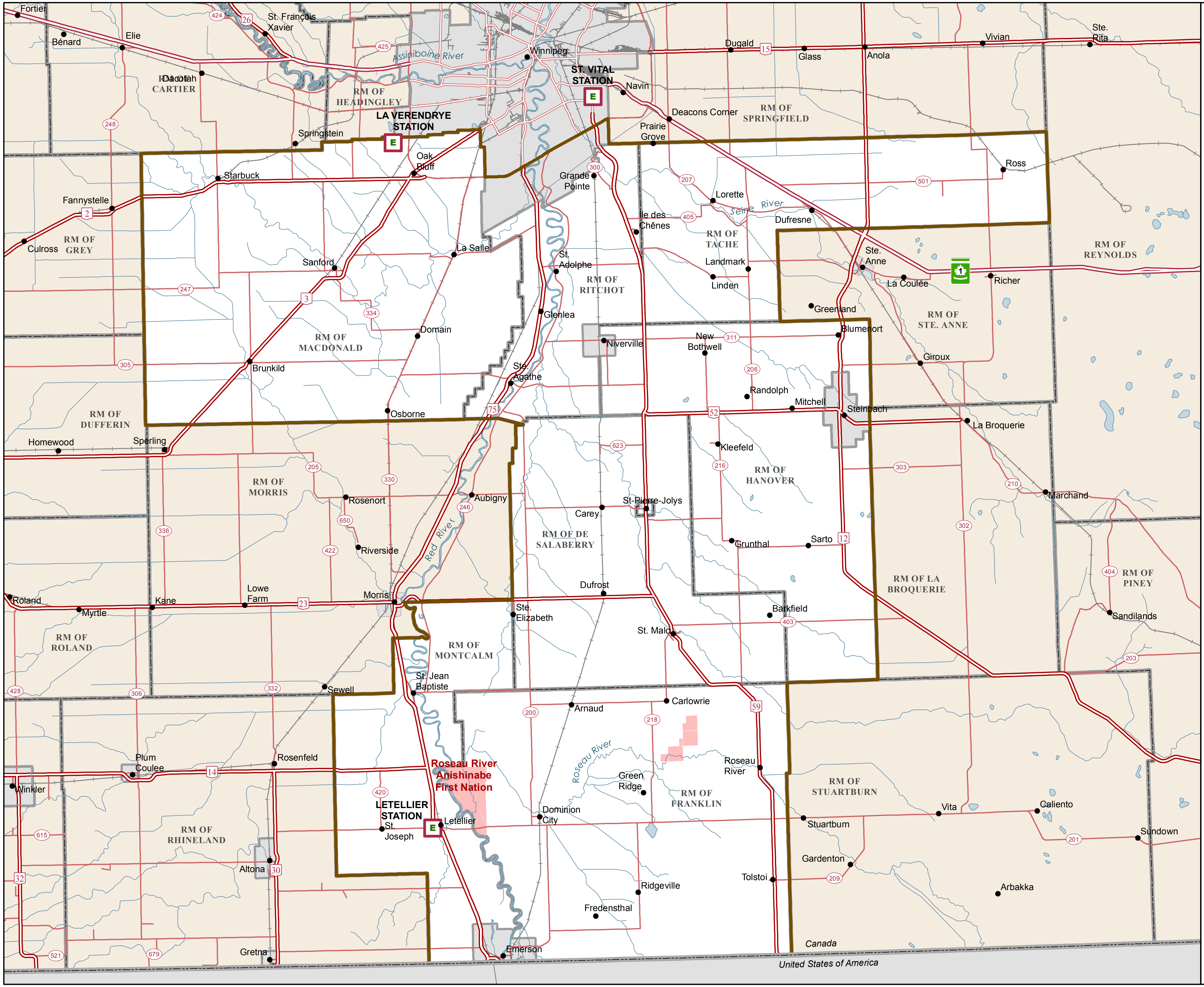
N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Protected Areas

Map 6-4



St. Vital Transmission Complex

Project Infrastructure

- E Electrical Station
- ▭ Socio-economic Regional Study Area

Landbase

- ● Community
- 1 Trans Canada
- 20 Provincial Highway
- — Provincial Road
- ┼ Railway
- ▭ City / Town
- ▭ Rural Municipality
- ▭ First Nation

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 27, 2014

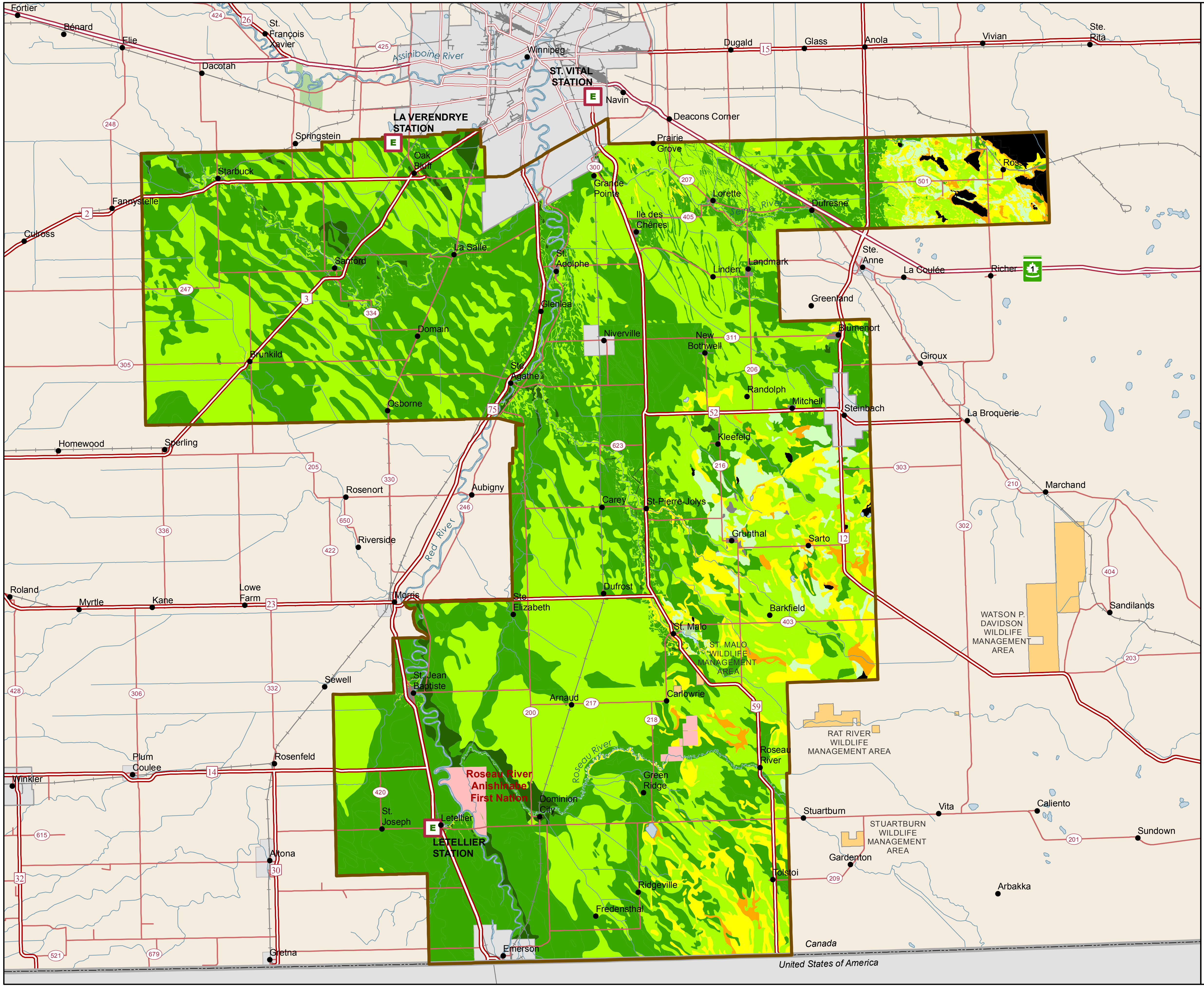
N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Socio-economic Regional Study Area

Map 6-5



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- E Electrical Station
- ▭ Socio-economic Regional Study Area

Agricultural Soil Capability

- 🟩 Class 1 - Soils have no significant limitations for crops
- 🟩 Class 2 - Soils have moderate limitations that restrict the range of crops that can be grown or require moderate conservation practices
- 🟩 Class 3 - Soils have moderately severe limitation that restrict the range of crops that can be grown or require special conservation practices
- 🟩 Class 4 - Soils have severe limitations that restrict the crops that can be grown or require special conservation practices, or both.
- 🟨 Class 5 - Soils have very severe limitations that restrict their capability to producing perennial forage crops, and improvement practices are feasible
- 🟧 Class 6 - Soils are capable of only supporting perennial forage crops, and improvement practices are not feasible
- 🟥 Class 7 - Soils have no capability for arable culture or permanent pasture
- ⬛ Organic
- 🟦 Water

Landbase

- ● Community
- 1 Trans Canada
- 20 Provincial Highway
- — Provincial Road
- ┼ Railway
- 🟥 First Nation
- 🟧 Wildlife Management Area
- 🟩 Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 27, 2014

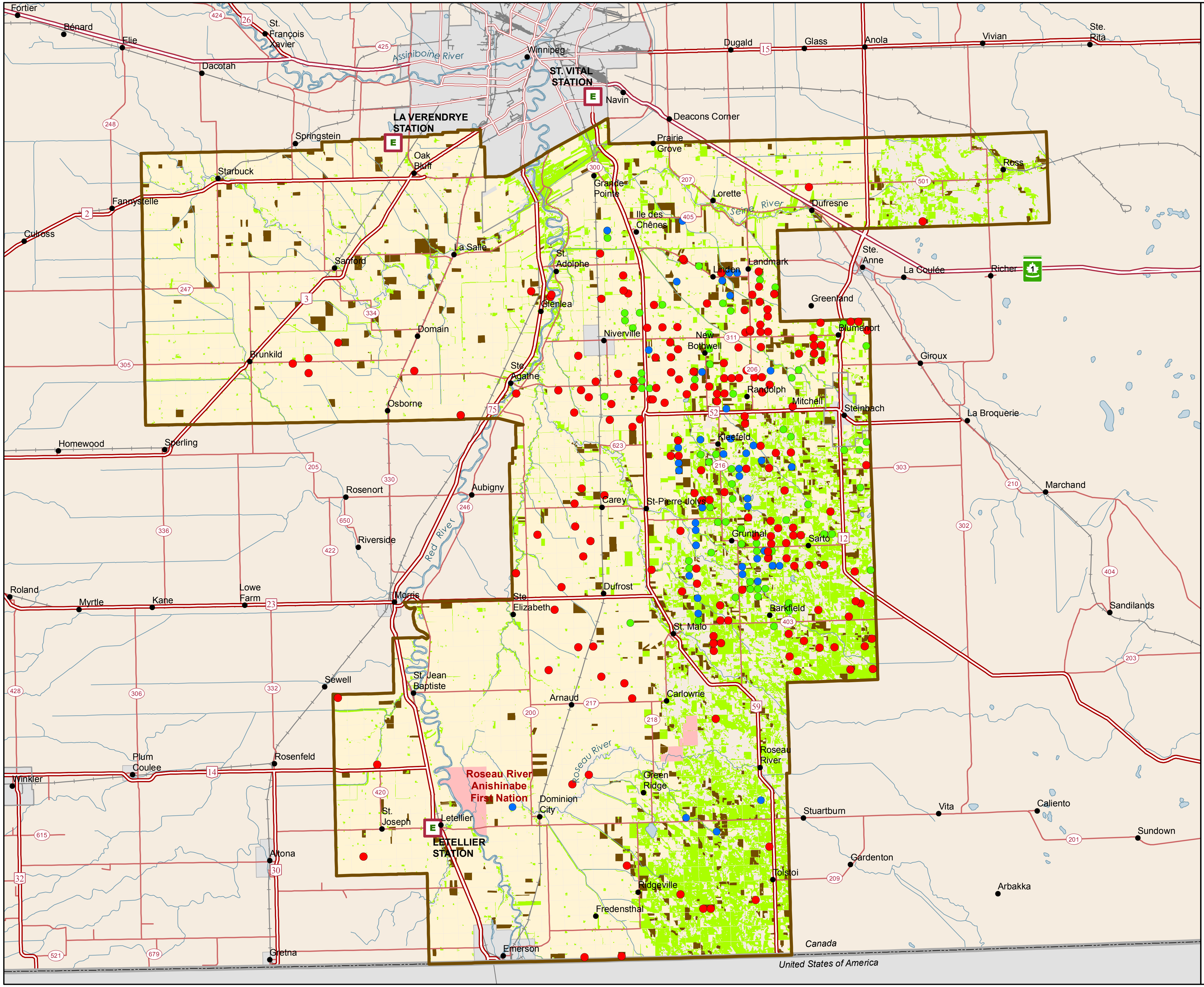
N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Agricultural Soil Capability

Map 6-6



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

E Electrical Station

▭ Socio-economic Regional Study Area

Agricultural Land Use

🔴 Hog Farm Operation[1]

🔵 Dairy Farm Operation[2]

🟢 Chicken and Hatching Egg Operation[3]

1. Source: Manitoba Pork Council (2014)
2. Source: Dairy Farmers of Manitoba (2013). Data not provided for Rural Municipality of MacDonald
3. Source: Manitoba Chicken Producers (2014)

Land Cover Classification

🟨 Annual Cropland

🟫 Perennial Cropland and Pasture

🟩 Range and Grassland

Landbase

● Community

1 Trans Canada

20 Provincial Highway

— Provincial Road

+ Railway

▭ City / Town

🟥 First Nation

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 27, 2014

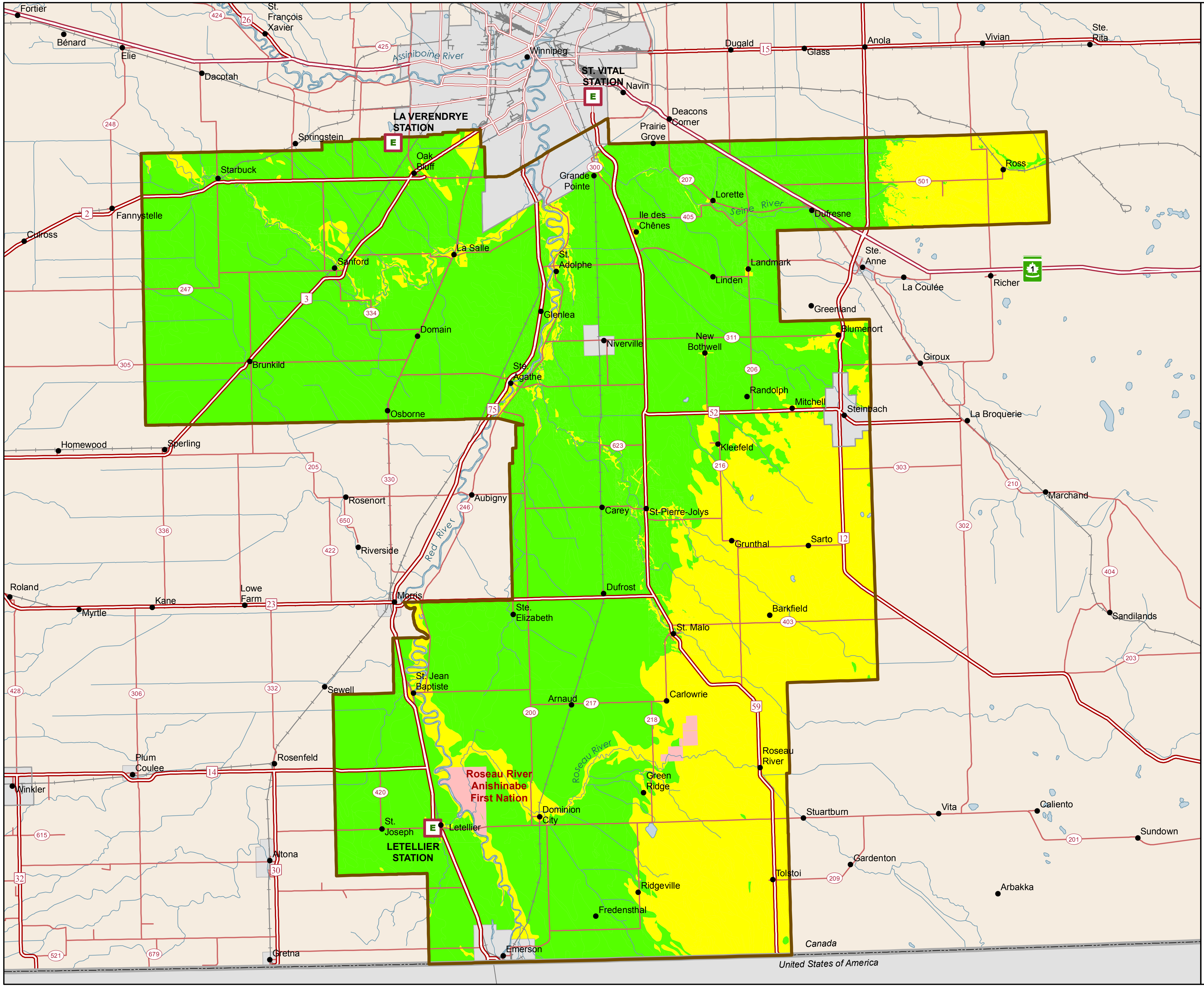
N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Agricultural Land Use

Map 6-7



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- E Electrical Station
- ▭ Socio-economic Regional Study Area

Aerial Application Likelihood

- 🟩 Higher Likelihood
- 🟨 Lower Likelihood

Landbase

- ● Community
- 1 Trans Canada
- 20 Provincial Highway
- — Provincial Road
- ┼ Railway
- ▭ City / Town
- ▭ First Nation

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 27, 2014

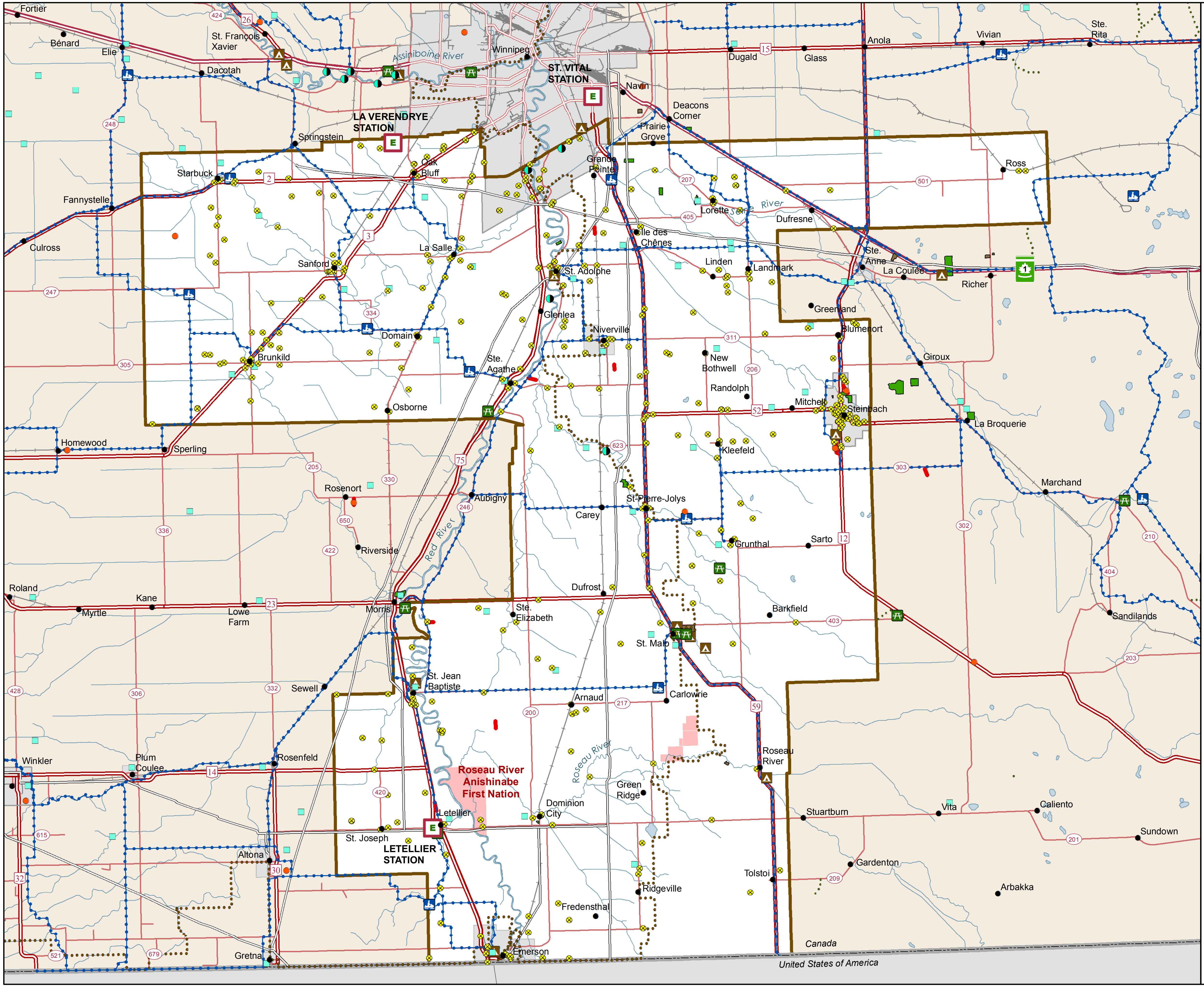
N

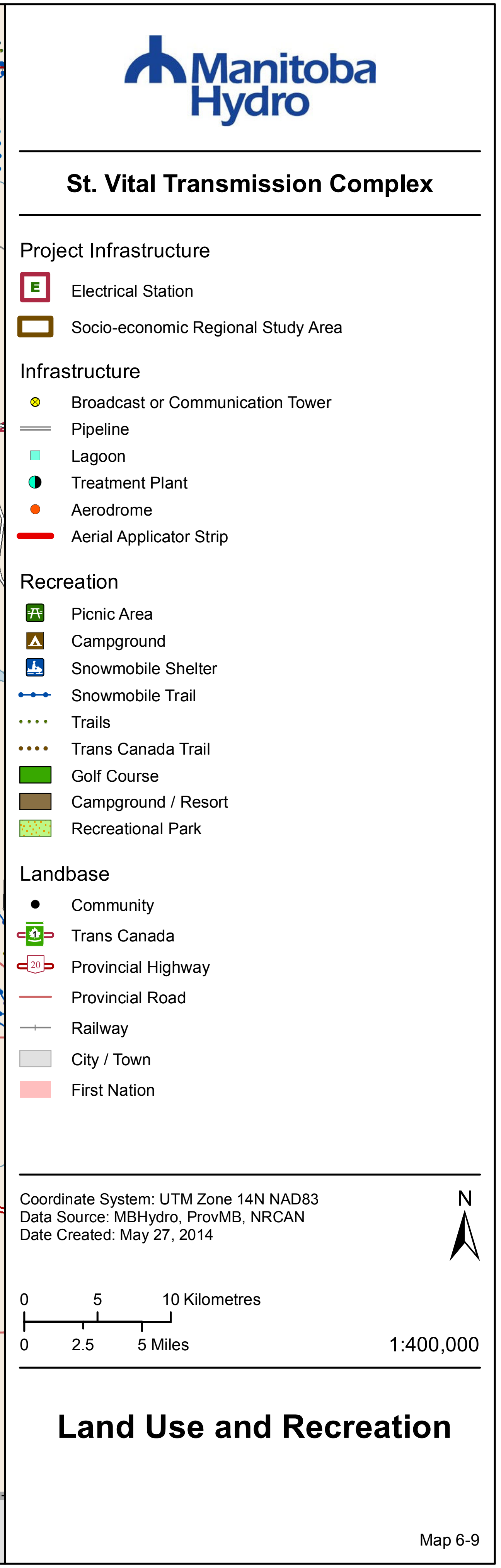
0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Aerial Application Likelihood

Map 6-8



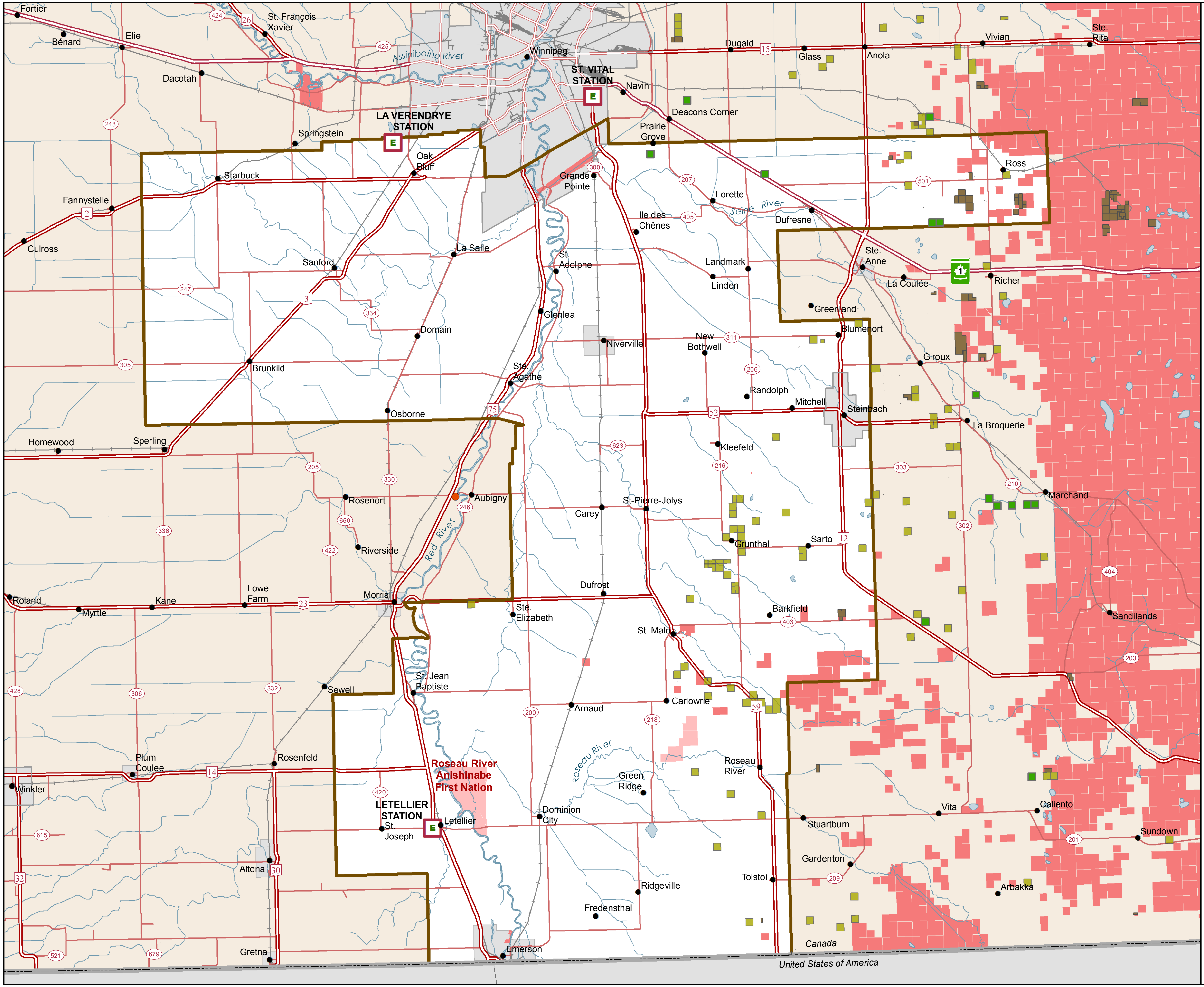


St. Vital Transmission Complex

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 27, 2014

Land Use and Recreation

Map 6-9



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- E Electrical Station
- ▭ Socio-economic Regional Study Area

Resource Use

- ● Mine Site
- 🟩 Managed Woodlot Location
- 🟫 Quarry Lease
- 🟨 Private Quarry Permit
- 🟥 Crown Land

Landbase

- ● Community
- 1 Trans Canada
- 20 Provincial Highway
- — Provincial Road
- ┼ Railway
- ▨ City / Town
- ▨ First Nation

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 27, 2014

N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Resource Use

7.0 PUBLIC ENGAGEMENT PROCESS

Manitoba Hydro undertook a Public Engagement Process (PEP) for the St. Vital Transmission Complex from July 2013 to May 2014. Through two rounds public engagement activities, Manitoba Hydro presented the Project and created opportunities to collect feedback and share information with local municipalities, First Nations, the Manitoba Metis Federation, stakeholders, and local community members.

To provide opportunity for participation, Manitoba Hydro offered a variety of venues for the public (including stakeholders) to share concerns and feedback. This included leadership and council meetings, public open houses, stakeholder meetings, community information sessions and Landowner Information Centres (LIC), a project email address and toll free information line.

To provide notification to the general public, Manitoba Hydro's PEP activities, a variety of notification methods were used, including newspaper, email, website updates, direct mailings, postal code mailings and poster notification.

Feedback and concerns raised by PEP participants, as well as site specific information, was provided to discipline specialists in order to inform their independent assessment of the Project and to assist in route selection.

7.1 PURPOSE, GOALS AND OBJECTIVES

The PEP for site selection and environmental assessment work is integral to determine a route which minimizes effects on people and the environment. The purpose of the PEP was to engage the public, local landowners, First Nations, the Manitoba Metis Federation (MMF) and stakeholders on the St. Vital Transmission Complex. Information collected as part of the PEP informed both the Route Selection and the Environmental Assessment undertaken for the Project.

The goals of the PEP were to:

- Share information as it becomes available
- Obtain feedback for use in the assessment process
- Gather and understand local interests
- Integrate interests and concerns into the assessment process
- Discuss potential mitigation measure

The objective of the PEP was to provide stakeholders and the general public with meaningful opportunities to receive information about, and provide input into the site selection and environmental assessment processes. The PEP included:

- Engaging with stakeholders and the general public, including First Nation and Metis, at various stages of the site selection and environmental assessment processes.
- Conducting Key Person Interviews to support the environmental assessment, particularly related to socio-economic considerations.
- Providing input into site selection (opportunities and constraints) and the environmental assessment (valued ecosystem components, socio-economic considerations, potential effects, mitigation measures) from information gathered during the PEP.

7.2 PUBLIC ENGAGEMENT AND THE SITE SELECTION PROCESS

Manitoba Hydro implemented a new Site Selection Methodology for this Project, based on an approach developed by the Electric Power Research Institute – Georgia Power Corporation (EPRI-GTC). This process engaged stakeholders from the early stages of site selection. The Public Engagement Program in conjunction with the EPRI-GTC methodology provided opportunities for stakeholders and the public to be involved in the selection of a Preferred Route for the St. Vital Station to Letellier Station transmission line. A summary of the methodology used is included in Open House materials found in Appendix D (Public Engagement Process Technical Memorandum) and further discussed in Chapter 8, Site Selection.

7.3 NOTIFICATION METHODS

A variety of notification methods were used to inform to local municipalities, First Nations, the Manitoba Metis Federation, stakeholders, and local community members of the activities being undertaken by Manitoba Hydro in relation to the Project. Notification methods utilized for the PEP are outlined in this section.

7.3.1 Direct Mailings

Stakeholders, First Nations, the MMF and municipal/town councils were notified by direct letter for Round 1. Landowners in the project route planning area were also notified by letter and over 2,200 letters were sent out by Manitoba Hydro during Round 1 (Appendix D).

The package provided in the direct mailing included relevant items from those listed below.

- A letter to the landowner, stakeholder, First Nation, MMF.
- A Project map.

- Project website and information line telephone number.
- Public open house schedule.

The packages aimed to inform interested parties of the activities being undertaken, including information on the current status of the Project. Letters offered an opportunity to meet with the Manitoba Hydro representatives to discuss the Project. Contact information was provided and interested parties were contacted by phone to arrange a meeting time.

In Round 2, direct mailings were undertaken to landowners that would be potentially traversed by the Project infrastructure to inform them of the opportunities available to gather information and share their feedback into the environmental assessment process.

Round 2 mailings were also undertaken to stakeholders, First Nations, the MMF, municipal/town councils to provide information regarding the current status of the Project and indicated a desire to meet to discuss the Project.

7.3.2 Newspaper

During Rounds 1 and 2, Regional and Local newspaper advertising was used to inform the public of Project PEP activities. Advertisements ran two weeks prior to the event, up until the day of the event. All newspapers utilized outlined all Public Open House listings, project website, the project information line and email address.

7.3.3 Radio

For the Community Information Sessions in Peguis First Nation, the event was advertised on the Peguis First Nation Country Rock Radio Station from November 22 to 25.

7.3.4 Posters

For the Community Information Sessions in Peguis First Nation and Selkirk, specific community posters were created and emailed to community representatives to post around the community prior to the event.

7.3.5 Postcards

For Round 1, Manitoba Hydro produced postcards to further inform people of the locations and times of the Public Open House events, which were mailed to approximately 7,000 addresses (see Appendix D) in the route planning area including Sage Creek and the Southern Loop. These postcards also included the toll free information line, email address and project website for further project information.

For Round 2, postcards were produced informing of upcoming Open House events and were sent to 8,360 addresses (Appendix D).

7.3.6 Project Website

Manitoba Hydro developed a Project specific website for the St. Vital Transmission Complex, which includes information on the following:

- Project description
- Schedule
- Public Engagement Process
- Environmental Assessment and Route Selection
- Document library (which includes):
    - EMF Brochures
    - Public Open House Advertisements
    - Public Open House Postcard
    - Newsletters
    - Comment Sheet
    - Maps
    - GIS Data
- Contact information

Manitoba Hydro also advertised locations for all Public Open Houses on the Project website and updates the website as material becomes available and as the project progresses.

7.3.7 Project Information Line and Project Email Address

The Project information telephone line (1-877-343-1631) and email address (LEAprojects@hydro.mb.ca) were used and continue to be used to address any Project-related questions from members of the public, stakeholders or affected landowners. The toll-free number was listed on the notifications utilized for both Round 1 and 2.

7.4 ENGAGEMENT ACTIVITIES

A variety of venues were available for interested parties to provide feedback on the Project. The following activities were undertaken for landowners, stakeholders and members of the general public:

- Key person interviews
- Stakeholder meetings (prescheduled and on request)
- Public open houses
- Landowner Information Centres (in coordination with public open houses).

Activities to engage with First Nation communities that were undertaken include:

- Community Information Sessions
- Leadership meetings

Landowners, Provincial government, stakeholders, First Nations, the MMF and the general public were notified of the activities being undertaken as outlined in the previous section. These venues provided opportunities to share information, gather feedback, and address questions and concerns with interested parties. These activities aimed to achieve the goals outlined in Section 3.1. Each activity is outlined in the following section.

Table 7.4-1: Timelines for Engagement Activities

Round	Timeline	Engagement Activities
Round 1	July-October 2013	Workshops
		Public Open Houses
		Meetings
		Key Person Interviews
		Email/Phone Line
Round 2	October 2013-January 2014	Public Open Houses
		Meetings
		Landowner Information Centres
		Community Information Sessions
		Email/Phone Line
Completion of Round 2 to Filing	January-May 2014	Email/Phone Line
		Meetings

7.4.1 Round 1 Engagement Activities

7.4.1.1 Key Person Interviews

Key Person Interviews (KPI) conducted in Round 1 of the Public Engagement Process aimed to obtain information from representatives of a wide range of organizations that may have interest in the proposed development of the two new transmission lines.

7.4.1.1.1 Purpose and Approach

KPIs provided one-on-one interview opportunities with key information holders representing public agencies, private sector organizations and non-governmental organizations (NGOs), with knowledge of a wide variety of factors related to transmission line impacts, both positive and negative.

7.4.1.2 Identification of Key Person Contacts

KPI contacts were identified based on the project team members' general knowledge of the Study Area and previous experience with groups involved in Manitoba Hydro projects.

7.4.1.2.1 Sectors

A number of sectors were identified and separate interview scripts were developed for each. Tailored scripts for each sector are included in Appendix D. By October 15, 2013, over 54 KPI contacts had been made: 19 declined interviews and 35 surveys were completed. A further 15 contacts were deemed not responsive after three contact attempts. A breakdown of interviews by sector is provided in Table 7.4-2.

Table 7.4-2: KPI Interviews by Category

Category	Number of Interviews
Business and Industry	3
Environment	9
Municipal	7
Trappers	1
Education	7
Agriculture	5
Infrastructure	2
Health	1
Policing	0
Total	**35**

Most of the interview questions addressed common topics, although the emphasis on each group type was different for each (see Appendix D). Interviewees were also asked whether they would be interested in participating in a Stakeholder Workshop for the project, and were provided with Manitoba Hydro contact information should they have additional questions. Interviewees were also asked whether their responses could be applied to other Manitoba Hydro projects planned for southern Manitoba.

7.4.1.2.2 Organizations Contacted

Various groups were requested to participate in the KPI process. Not all groups agreed to be interviewed but some chose to attend a workshop to share their feedback through other means of engagement. Groups representing the following sectors were invited to participate in the process (Table 7.4-3). Aboriginal engagement is summarized in Section 7.4.3.

Table 7.4-3: Groups Invited to Participate in the KIP Process

Government Groups	• Manitoba Infrastructure and Transportation • Manitoba Floodway Authority • Manitoba Agriculture, Food and Rural Initiatives • Manitoba Local Government • Manitoba Conservation and Water Stewardship (Forestry, Wildlife, Parks and Natural Areas and Water Stewardship) • Manitoba Culture, Heritage and Tourism • Manitoba Historic Resource Branch • Land Value Appraisal Commission • Manitoba Health, Office of Disaster Management • Public Utilities Board
School Boards & Educational Groups	• School Divisions (9) • Providence College
Agricultural Groups	• Keystone Agricultural Producers • Manitoba Aerial Applicators Association • Manitoba Pork Council • Manitoba Beef Producers • Manitoba Turkey Producers • Manitoba Chicken Producers • Dairy Farmers of Manitoba
Cities/Towns/Municipalities	• Cities, Towns and Rural Municipalities in the Study Area (10)

Table 7.4-3: Groups Invited to Participate in the KIP Process

Health Authorities/RCMP	• Southern Regional Health Authority • RCMP Detachments
Wildlife and ENGOs	• Manitoba Wildlife Federation • Manitoba Naturalist Society (Nature Manitoba) • Nature Conservancy of Canada, Manitoba Division • 50 by 30 • Ducks Unlimited • Trans Canada Trail Association • Manitoba Trappers Association
Recreation Groups	• Sno-Man Inc. • All-Terrain Vehicles Manitoba Inc.
Interest Groups	• Bipole III Coalition
Conservation Districts	• Conservation Districts (2)
Other	• Emerson Milling • Railway

7.4.1.2.3 Interview Scripts by Sector

Interview scripts were tailored to specific sectors. For example, specific questions related to various sectors included:

- Agricultural KPI asked specifically about the overall impacts on agricultural operations, including for example the effects of transmission lines on GPS or other navigational tools.
- Business and Industry KPI asked about the effects of electric power system reliability on operations.
- Education KPI asked about student enrolment and any programs linked to Manitoba Hydro (co-op).
- Environmental KPI asked about what environmental features, such as water quality, wetlands, wildlife habitat, were important to their organizations, as well as the impacts of power transmission lines on such features.
- Health KPI asked about facilities and services, impacts on emergency response times and perceived health impacts of power transmission lines.
- Municipal KPI asked about linear infrastructure, roads, rail and drainage ditches, and suitability for construction of adjacent power transmission lines. This KPI also asked about future residential, commercial and industrial development and municipal public works

projects, and airports. Other questions addressed transmission line right-of-way access and safety issues.

- Policing KPI (general letter) addressed emergency response times, as well as types of crime.
- Trappers KPI asked specific questions related to positive and negative impacts on animal populations and potential use of transmission line corridors by trappers.

7.4.1.3 Stakeholder Workshops

7.4.1.3.1 Purpose and Approach

Stakeholder Workshops were held during Round 1 of public engagement. The purpose of the three Stakeholder Workshops was to engage representatives of a wide range of organizations concerned with the potential effects of transmission lines in group discussions related to site selection and the environmental assessment process.

Table 7.4-4: Stakeholder Workshop Locations

Town	Location	Date	Time
Dominion City	Dominion City Community Hall	August 20, 2013	9:00 am – 2:00 pm
Mitchell	Mitchell Area Seniors Centre	August 21, 2013	9:00 am – 2:00 pm
Winnipeg	Winakwa Community Centre	August 22, 2013	9:00 am – 2:00 pm

Participants were asked to identify their issues and concerns, constraints, opportunities and mitigation strategies related to alternative routes identified. These alternatives comprised some 20 route segments for the St. Vital Station to Letellier Station Transmission Line.

Stakeholder Workshops provided opportunities for participants to:

- Learn more about the Project.
- Provide information, concerns and preferences regarding Alternative Routes.
- Interact and exchange viewpoints with other stakeholder representatives about the Alternative Routes for the Project and to discuss transmission line siting.

7.4.1.3.2 Identification of Stakeholder Participants

The contact list for Stakeholder Workshops was based on the following sources:

- previous stakeholder lists

- KPI candidates
- Peguis First Nation
- Roseau River Anishinabe First Nation
- the Manitoba Metis Federation

7.4.1.3.3 Attendance

Attendance at Stakeholder Workshops included representatives of the following groups:

- Dominion City – 7 people, including representatives of Manitoba Infrastructure and Transportation (MIT), MAFRI, Manitoba Local Government (2), Division Scholaire Franco-Manitoban (DSFM) and the RM of Franklin (2).
- Mitchell – 9 people including representatives of MIT (4), Keystone Agricultural Producers (District 4), Dairy Farmers of Manitoba, RM of Hanover, Trans Canada Trail, and Seine River Regional Conservation District.
- Winnipeg – 13 people including representatives of Manitoba Conservation and Water Stewardship (2), City of Winnipeg Planning Property and Development Department, RM of Ritchot (2), RM of Springfield, University of Manitoba Department of Landscape Architecture, and Manitoba Beef Producers. The Manitoba Metis Federation as well as representatives of Whelan-Enns Associates who observed the process.

7.4.1.3.4 Workshop Process

The workshop process began with a presentation describing the Project, key steps and considerations in planning alternative routes, the route selection process, the environmental assessment process, and then the approach for the workshop (Appendix D). Workshop participants were then asked to break into groups to conduct a map exercise using large maps and workbooks to record information on their concerns, opportunities, constraints and preferences for 20 alternative route segments identified by Manitoba Hydro. Figures showing these alternative route segments are included in Appendix D. Each team was asked to identify and rate physical constraints related to each of the segments and note the severity of the constraint as High, Medium or Low. Teams were also asked to identify opportunities for routing.

Following the workbook exercise, each team recorded their “Preferred Route” on large scale maps using the route segments provided. In some instances, teams decided to slightly adjust route segments, or develop their own segments to create new routes. Finally, the teams were asked to summarize their top three route criteria and top three mitigation strategies. All participants were then given the opportunity to review each of the groups Preferred Route maps. Using a dot-mocracy approach (a method in which participants could express their personal or organizational preferences), participants were provided with 6 blue (positive) and 6 red (negative) dots to use to highlight the route segments they liked or disliked and 3 blue dots and 3 red dots to indicate which aspects of the criteria and mitigation strategies were liked or disliked.

Workshop results are summarized in Appendices C3, C4 and C5 (AECOM 2013). Table C3-1 in the appendices summarizes all the criteria, rationale and mitigation measures along with dot-mocracy scores that were developed during the workshops.

7.4.1.4 Public Open Houses

7.4.1.4.1 Purpose and Approach

The purpose of Round 1 Public Open Houses was to inform the public about the Project and to obtain input on the Alternative Routes. Round 1 allowed the general public, local landowners and stakeholders to get information about the Project, provide feedback on issues and concerns, criteria and specific development constraints for the Alternative Routes.

7.4.1.4.2 Materials Presented

A Project newsletter was developed describing the Project (Appendix D). The newsletter was available at each Public Open House. The newsletter included Manitoba Hydro email and telephone contact details.

Storyboards and a presentation on the route selection process were prepared to explain the nature of the project, the purpose of the public engagement process, the approach to route selection and environmental assessment requirements (see Appendix D).

Other brochures and materials were available to address questions related to the Project including but not limited to information pertinent to electromagnetic fields, stray voltage and concerns related to dairy operations (see Appendix D)

Comment sheets were developed to obtain feedback from all attendees (see Appendix D). Large map sheets were used to summarize specific landowner information.

Materials provided at all open house venues were also made available on the Manitoba Hydro website.

7.4.1.4.3 Location and Attendance

Four Public Open House events were held in proximity to the alternative routes for Round 1, with one each in Dominion City (Community Hall), Mitchell (Mitchell and Area Seniors Centre), Winnipeg (Winakwa Community Centre) and Oak Bluff (Oak Bluff Recreation Centre). These locations were selected due to their proximity to the alternative routes and potentially affected individuals to assist in creating opportunities for participation. Posted times for the Open Houses was 4:00 pm to 8:00 pm on August 20, 21, 22, and August 27, 2013, respectively.

A total of 125 people attended the Round 1 Public Open Houses. Attendance at each of the four locations was as follows:

Dominion City	38 (33 signed in, 5 did not)
Mitchell	43
Winnipeg	33
Oak Bluff	11

The Public Open House events were organized around a series of stations with presentation storyboards, large maps and PowerPoint presentations. Copies of the storyboards, and the site selection presentation and storyboards (EPRI-GTC Methodology) are provided in Appendix D. A Google Earth Mapping Station and large scale landowner mapping stations were also provided at the Open House. Site specific information provided by Public Open House attendees on the large scale maps is summarized in Table D-4 in Appendix D. Copies of comment sheets provided by attendees at the Public Open Houses are included in Appendix D.

Round 1 Public Open House comment sheets received were analyzed further using Survey Monkey®. The report in Appendix D summarizes the 49 comment sheets that were returned on the Project as of October 15, 2013.

Materials presented at Public Open Houses were made available on the Project website.

7.4.1.5 Other Communication

In addition to these communications, Manitoba Hydro was requested to make a presentation on the Project to the RM of Montcalm. The Information line and email address was available to all members of the public to gather information and to provide feedback on the alternative routes being presented.

7.4.2 Round 2 Engagement Activities

7.4.2.1 Public Open Houses

7.4.2.1.1 Purpose and Approach

The Round 2 Public Open Houses were intended to provide the general public, landowners and stakeholders with the opportunity to review the Preferred Route developed following Round 1. Information obtained during Round 2 assisted in the identification of a Final Preferred Route.

7.4.2.1.2 Public Engagement Materials

Manitoba Hydro developed a second newsletter describing the Project, as well as the preferred route, the environmental assessment process, and engagement process, and describing the Preferred Route and the Southern Loop Transmission Corridor (Appendix D).

Materials developed for the Public Open Houses included storyboards, comment sheets, landowner information forms and maps. Materials were available on the Manitoba Hydro Project website.

7.4.2.1.3 Public Open Houses

Round 2 Public Open Houses were held the week of November 4, 2013. Venues were as follows:

- November 4 Dominion City Community Hall
- November 5 Cabane au Sucre, St. Pierre Jolys
- November 6 Trans Canada Centre, Ile des Chenes
- November 7 Winakwa Community Centre (Main Hall)

As with Round 1, the Open House events were organized in stations to present information through storyboards and to provide opportunities for public feedback about the Project. Comment sheets were provided to Round 2 Open House participants, specifically asking questions about the Preferred Route. See Appendix D for copies of the comment sheets.

Round 2 Open House comment sheets received were analyzed further using Survey Monkey®. The report in Appendix D summarizes the 57 comment sheets that were returned on the Project as of December 12, 2013.

7.4.2.2 Landowner Information Centres

Landowner letters were sent by direct mail notifying of upcoming Public Open House events. A total of 93 letters were sent by Manitoba Hydro to landowners whose land would be traversed by transmission line infrastructure. A copy of the landowner letter is included in Appendix D.

Landowner Information Centres (LICs) were set up within the Public Open House venues to address specific issues and concerns of local landowners. The LICs provided mapped information and data forms, which allowed landowners to document specific concerns and constraints and allowed one on one discussion with landowners with a Manitoba Hydro representative. LIC forms are found in Appendix D. The LICs were well attended and over 55 people provided detailed comments and location specific information related to the Preferred Route.

7.4.2.3 Other Communications

Manitoba Hydro met with various stakeholder and interest groups as well as landowners throughout Round 2. These meetings provided opportunities to share information and to have questions and concerns addressed.

The Information line and email address were available to all members of the public to gather information and to provide feedback on the alternative routes being presented.

7.4.3 Aboriginal Engagement

Manitoba Hydro provided opportunities for early and ongoing involvement regarding the proposed Project. Letters were sent to First Nation communities and the Manitoba Métis Federation (MMF) at the start of the project to introduce the project and request a leadership meeting and then during each Round to share information on the current status of the Project.

In total, Manitoba Hydro notified and invited two First Nation communities and the MMF to participate as they were thought to have an interest in the Project. First Nation communities thought to have an interest in the project, as noted below, were based on previous interactions and/or geographic locations of the communities in relation to the Project.

Manitoba Hydro's initial contact included letters with contact information and the Project website. In addition, a variety of mechanisms were used to communicate, receive feedback and engage in ongoing meaningful dialogue by holding community information sessions and leadership meetings.

Manitoba Hydro used an adaptive approach to engagement by asking communities during meetings how their community would like to be engaged during the project instead of using one approach for all the communities.

Should the Project proceed, Manitoba Hydro will offer to hold Environment Protection Plan (EnvPP) meetings with communities that have expressed an interest in receiving updates on the Project. At the EnvPP meetings, Manitoba Hydro will present what we have heard from the community and how we are planning to address what we have heard.

Communications, meetings and community Open Houses are summarized in the following tables. Feedback received through the Aboriginal engagement process has been summarized in Section 7.5.5 with all the feedback received through the PEP.

7.4.3.1 Community Information Sessions

Community Information Sessions provided Peguis First Nation with an opportunity to access information and to provide feedback regarding the Project to Manitoba Hydro representatives. This method of communication also provided an opportunity for direct discussions with community members.

A wide variety of information was provided at the Information Sessions including Project storyboards, Project newsletters, localized mapping and comment sheets.

7.4.3.2 First Nation Leadership Meetings

Leadership meetings provided opportunities for early and ongoing involvement regarding the proposed Project and were held with interested communities to communicate Project activities, receive feedback, and discuss engagement plans and concerns.

Meetings began with a PowerPoint presentation (hard copy or on screen). Participants received printed copies of the presentation and a newsletter.

In total, six meetings were held with two communities. Two meetings were held in Round 1 and four meetings were held in Round 2.

7.4.3.2.1 Peguis First Nation

Manitoba Hydro provided an opportunity for Peguis First Nation to participate early in the engagement process for the St. Vital Transmission Project. On August 6th, 2013, a letter was sent to Peguis First Nation requesting the opportunity to share information and discuss the Project.

Manitoba Hydro provided Peguis First Nation with updates during Round 1 and Round 2 of the planning process by sending letters and meeting to discuss the Project. The approach to the Peguis First Nation’s engagement in the Project is adaptive as Manitoba Hydro met on October 16, 2013 to discuss how Peguis First Nation’s would like to be engaged in the Project and subsequently held two community information sessions on November 18 and 26, to share information with Peguis First Nation members living on reserve and off reserve. The community information sessions provided opportunities for Manitoba Hydro to understand local interests and integrate interests and concerns into the assessment process. Table 7.4-5 provides a summary of the engagement, which Manitoba Hydro has had with Peguis First Nation on the Project.

Table 7.4-5: Peguis First Nation Engagement

Round	Date	Type of Engagement	Description
Round 1	August 6, 2013	Letter	Round 1 letter from Manitoba Hydro to inform the community of the Project. The initial package included a newsletter, letter and available public mapping.
Round 2	October 16, 2013	Meeting	Meeting with Manitoba Hydro and Peguis First Nation included discussion about organizing two community meetings to discuss the Project
	October 21, 2013	Letter	Round Two Letter from Manitoba Hydro to advise Peguis First Nation that a Preferred Route has been developed for the Project. Included a newsletter, and available public mapping.
	November 18, 2013	Community Information Session	Community Information Session held in Selkirk for off reserve members of Peguis First Nation
	November 26, 2013	Community Information Session	Community Information Session held in Peguis First Nation
	January 21st 2014	Meeting	Meeting with Manitoba Hydro and Peguis First Nation included discussion about the two community information sessions that were held.

7.4.3.2.2 Roseau River Anishinabe First Nation

Manitoba Hydro provided an opportunity for Roseau River Anishinabe First Nation to participate early in the engagement process for the St. Vital Transmission Project. On August 6, 2013, a letter was sent to the Roseau River Anishinabe First Nation requesting the opportunity to share information and discuss the Project. An initial meeting was held on August 9, 2013, to discuss Roseau River Anishinabe First Nation’s engagement in the Project.

Manitoba Hydro provided Roseau River Anishinabe First Nation with updates during Round 1 and Round 2 of the planning process by sending letters and meeting on three occasions to provide Project updates. Manitoba Hydro will continue to engage with the Roseau River Anishinabe First Nation to share information and address potential concerns related to this project. Table 7.4-6 provides a summary of the engagement, which Manitoba Hydro has had with the Roseau River Anishinabe First Nation on the Project.

Table 7.4-6: Roseau River Anishinabe First Nation Engagement

Round	Date	Type of Engagement	Description
Round 1	August 6, 2013	Letter	Round 1 letter from Manitoba Hydro to inform the community of the Project. The initial package included a newsletter, letter and available public mapping.
	August 9, 2013	Meeting	Meeting to provide an overview of St. Vital Transmission Complex and the Manitoba-Minnesota Transmission Project and discuss RRAFN's engagement in both projects.
	September 25, 2013	Meeting	The meeting was to discuss the draft engagement plan and the proposed community coordinator position
Round 2	October 21, 2013	Letter	Round 2Letter from Manitoba Hydro to advise the community that a Preferred Route has been developed for the Project. Included a newsletter, and available public mapping.
	October 31, 2013	Meeting	Meeting to provide updates on MMTP and St. Vital Transmission Project
	March 21, 2014	Meeting	Meeting to provide updates on MMTP and St. Vital Transmission Project and discuss next steps

7.4.3.2.3 Manitoba Métis Federation

Manitoba Hydro provided an opportunity for the Manitoba Métis Federation (MMF) to participate early in the engagement process for the St. Vital Transmission Project. On August 6th, 2013, a letter was sent to the MMF requesting the opportunity to share information and discuss the Project. An initial meeting was held on August 21, 2013, where the MMF indicated an interest in providing input through a Traditional Land Use and Knowledge Study (TLUKS) for the Project.

Manitoba Hydro provided the MMF with updates at various stages of the planning process by sending letters and having three meetings during Round 1 and three meetings during Round 2 to discuss the MMF’s engagement in the Project and the development of their TLUKS. The approach to the MMF’s engagement in the Project is adaptive as Manitoba Hydro and the MMF are working together to develop a mutually agreeable work plan and budget for a TLUKS. The potential study would provide the MMF with the opportunity to communicate with their members about the Project through a project information session, a notice in a community paper and a post-interview meeting. The results of this type of study may help inform the Environmental Protection Plan for the Project. Manitoba Hydro will continue to engage with the MMF to share information and address potential concerns related to this project. Table 7.4-7 provides a summary of the engagement, which Manitoba Hydro has had with the MMF on the Project:

Table 7.4-7: Manitoba Métis Federation Engagement

Round	Date	Type of Engagement	Description
Round 1	August 6, 2013	Letter	Round 1 letter from Manitoba Hydro to inform the MMF of the Project. The initial package included a newsletter, letter and available public mapping.
	August 12, 2013	Letter	Letter from the MMF regarding their engagement in Project
	August 14, 2013	Letter	Letter from Manitoba Hydro in response to the MMF’s letter
	August 21, 2013	Meeting	Meeting to discuss the MMF's engagement in the Project
	September 12, 2013	Meeting	Meeting to discuss the MMF's engagement in the Project
Round 2	October 2, 2013	Meeting	Meeting with the MMF to discuss their engagement in the Project and to share information about the preferred route for the Project.
	October 15, 2013	Meeting	Meeting to discuss the MMF’s engagement in the Project
	October 18, 2013	Letter	Letter from Manitoba Hydro regarding the MMF’s TLUKS proposal.
	October 21, 2013	Letter	Round Two Letter from Manitoba Hydro to advise the MMF that a Preferred Route has been developed for the Project. Included a newsletter, and available public mapping.
	October 28, 2013	Letter	Letter from the MMF regarding the MMF’s TLUKS proposal.
	November 8, 2013	Meeting	Meeting to discuss the MMF's engagement in the Project
	November 15, 2013	Letter	Letter from Manitoba Hydro regarding the MMF’s TLUKS proposal.
	January 13, 2014	Meeting	Meeting to discuss the MMF’s engagement in the Project
	February 28, 2014	Letter	Letter from Manitoba Hydro regarding the MMF’s TLUKS proposal.

7.5 FEEDBACK RECEIVED

The following section summarizes the feedback received throughout the public engagement process.

Feedback was incorporated at different stages in the route selection and environmental assessment processes. The following outlines the chronology of feedback received and the outline of the section.

- Segment specific feedback and proposed alterations received regarding route segment alternatives from Round 1.
- Incorporation of feedback and proposed alterations into the route evaluation process.
- Outcome of the route evaluation process and its relation to the determination of a preferred route to present in Round 2
- Feedback and alterations received during Round 2.
- Incorporation of feedback into the final preferred route submitted.

A summary of the concerns/comments made regarding the entire project (throughout both Rounds) are also included in this section and outlines how Manitoba Hydro addressed these concerns or how Manitoba Hydro plans to mitigate these concerns.

Feedback, comments and concerns received throughout the process can be found in Appendix D.

7.5.1 Feedback and Alterations – Round 1 F

Round 1 of the Public Engagement Process for the St. Vital Transmission Complex was successful in obtaining a variety of perspectives, which together helped inform identification of a Preferred Route for the new transmission line between St. Vital Station and Letellier Station.

Key informants in the KPI interview process identified a range of environmental and socio-economic considerations related to the project, as well as general and specific constraints impacting the transmission line location.

Stakeholders attending Workshops identified their issues and concerns with Alternative Route Segments, their suggested criteria for route selection and their preferred routes. Stakeholders identified a number of additional alternatives to the Alternative Route Segments presented in the Workshops, which would better meet their teams' criteria and avoid particular constraints. These route segments were added to the route selection process and informed the Preferred Route identified by Manitoba Hydro following the Round 1 Public Engagement.

Members of the public, local landowners and stakeholders who attended the Round 1 Public Open House events identified their issues and concerns about the proposed transmission line, and location-specific constraints related to different Alternative Route Segments. Many Open House participants also suggested revisions to the Alternative Route Segment alignments to address specific issues and concerns. Issues and concerns identified throughout Round 1 can be found in Appendix D.

7.5.1.1 Segment Specific Feedback from Key Person Interviews

A number of location specific considerations were identified by the key informants during the KPI process (Appendix D). Segments presented to key informants were labelled following the naming convention included in the Workshop materials prepared for the Project (Appendix D). Specific considerations noted, along with their applicable segment identifiers (N-1, N-2, N-3 etc.) were documented and considered in the route evaluation process to determine a preferred route for the project.

A summary of KPI responses by sector as well as materials provided by stakeholder groups related to socio economic issues can be found in Appendix D.

7.5.1.2 Summary of Stakeholder Workshop Findings

The criteria used by individual Workshop teams to determine their preferred routes were sometimes at odds with those of other teams. Within individual teams compromises were generally reached when addressing particular route segments, but sometimes team members were not able to reach agreement on a preferred route segment.

The following is a summary of criteria and concerns received from workshop participants. The documentation of feedback received can be found in Appendix D.

Roadways/Infrastructure

Participants expressed a desire to parallel existing infrastructure (rail, provincial roads (PR), existing transmission lines) where possible and to minimize Provincial Trunk Highway (PTH) crossings. Participants noted a preference to maximize the use of government right-of-way over private property.

Paralleling of PTHs and PRs was viewed positively whereas there was note that future development and expansion of some roadways may interfere with the roadway development.

General Routing Criteria

Straight more direct routes were preferred by participants. Participants noted that routing should take advantage of mile alignments as opposed to half mile alignments.

Avoidance of residential development and urban communities was deemed preferred when routing transmission lines.

Wildlife/Water/Vegetation

Participants noted a desire to avoid native prairie and native habitat. Participants noted that avoidance of forested areas and wetlands should be a routing consideration. Waterfowl impacts were also viewed as a concern.

Participants indicated concerns regarding potential interference with hunting and harvesting (sage, sweet, grass, etc.) during construction of the Project.

Agriculture

Participants noted that in order to minimize impact on agriculture routing should seek to avoid/minimize impacts on agricultural activities. Towers should be kept low in agricultural areas to minimize impact on aerial application.

Other concerns raised include the potential for invasive species to spread and the interference of the structures with manure application and aerial application. Use of marginal lands was viewed more favorably than prime agricultural lands.

There was also a desire by some participants to avoid dairy and cattle operations as there is a view the project may cause stray/tingle voltage thus affecting these operations.

Compensation

Participants noted a need to ensure adequate and fair compensation (based on market value) for the lands taken out of production.

7.5.1.3 Workshop Comment Sheets and Debriefings

Table C3-2 in Appendix D provides Workshop team comments by route segment, as well as the dot-mocracy scores for each segment. Note that each of the route segments must connect to others, meaning there were a limited number of combinations of segments that could make up complete routes.

Comments received from stakeholder participants on methodology and general process are summarized in Appendix D. Similarly, Workshop debrief notes with respect to any suggestions for improvement of the process are also summarized in Appendix D.

7.5.1.4 General Responses in Comment Sheets Received

Thirty-six, 73% of respondents, said they lived near an alternative route and 37 respondents said they had concerns with the alternatives. Predominant concerns were as follows:

Table 7.5-1: General Response in Comment Sheets

Concerns	Percentage of Respondents
Agricultural	76%
Tingle voltage	49%
Loss of land	43%
Economic	43%
Visual impacts and aesthetics	33%
Construction of the line	25%
Access to the right-of-way	20%
Wetland impacts	14%
Vegetation protection	16%
Reclamation considerations	12%

The comment sheet also asked participants to rank their personal preferences as to how to route a transmission line. The top four transmission line siting preferences were as follows, based on greatest number of #1 rankings.

- Parallel to existing transmission infrastructure
- Follow existing roadways
- Follow existing rail lines
- Follow mile (Section) lines

7.5.1.5 Location Specific Concerns

Location specific concerns were also identified through the comment sheets and meetings. Most concerns/constraints identified were related to personal landholdings but also general routing considerations such as lagoon locations, airfields, sensitive wetlands, tower placement, and agricultural interference were provided. Information collected through these mechanisms is outlined in Appendix D.

7.5.1.6 Proposed Alterations to Alternative Routes – Round 1

A number of proposed alterations to the Alternative Routes were suggested by Workshop participants and Open House attendees. Table 7.5-2 provides a summary of the 30 proposed adjustments selected from the Workshop teams' Preferred Routes mapping exercise, or suggested by Open House participants, and through meetings, emails and telephone calls. The table also provides Manitoba Hydro's comments indicating their consideration of the proposed alterations. In general, proposed alterations to the alignment were evaluated as part of preferred route selection if the proposed alteration did not shift the impact to other interests and had an apparent net benefit to the overall potential project impact.

A number of routing considerations were noted across a wide range of interests. Route consideration relating to the location of aerial applicators activities and landing strips was brought forward through workshops, open houses and telephone calls and emails. General concern was expressed about aerial spraying in proximity to transmission lines and the limitation of their ability to access the crop. Glide paths for land strips as well as the fields themselves were noted as an important constraint to consider. Other significant route location concerns related to the presence of sewage lagoons, campground, cemetery and landfills, as well as locations of residences, and commercial and industrial land uses.

Mitigation strategies proposed by KPI and workshop participants, and Open House attendees typically emphasized avoidance. The types of mitigation measures identified included: minimizing the agricultural footprint using provincial and municipal rights-of-way; reclamation of native species; using bird diverters in specific areas; avoiding east-west alignments; avoiding dairy operations; avoiding residential development and designated and zoned residential areas; avoiding PTHs; and following the legislation to control weeds. Other suggestions included placing lines underground in areas with aesthetic issues or aerial applicators.

Table 7.5-2: Proposed Alterations to Alternative Routes

Segment ID-Adjustment ID	Source	Adjustment Consideration	Manitoba Hydro Response	Outcome
N2-1	Open House	Follow existing transmission corridor	Diagonal routing will be a hindrance to aerial spraying, and requires a jog back and extra angle tower at additional expense.	Not to be included in Alternative Route evaluation
N4-1	Open House	Jog out around house		To be considered
N4-2	Open House	Follow Manning Canal longer east and take East route	Diagonal routing will be a hindrance to aerial spraying, and requires a jog back and extra angle tower at additional expense.	Not to be included in Alternative Route evaluation
N6-1	Workshop	Avoid major road crossings, avoid crossing PTH 59 and PR 210 junction		To be considered
N7-1	Workshop	Avoid landfill		To be considered
N9-1	Workshop	Avoid wetland and stream crossings	Too close to Bipole III route and N9-2 accomplishes same end of connecting N9 to N10	Not to be included in Alternative Route evaluation
N9-2	Workshop	Avoid ecological areas, avoid multiple stream crossings		To be considered
N11-1	Open House	Avoid tributary, increases separation distance to dairy operation, avoids residences		To be considered
N11-1	Open House	Realignment supported by another Open House attendee		To be considered
N11-1	Open House	Realignment supported by another Open House attendee		To be considered
N11-2	Open House	Avoid hog barn location and area landowner is cropping		To be considered
N-11-3	Open House	Avoid houses and a dairy	Travelling south from crossover of S2, no net benefit, crosses directly in front of too many other homes	Not to be included in Alternative Route evaluation
N11-4	Open House	Preference to keep on east side of Plot 11, minimize impact on open field		To be considered
N11-5	Workshop	Avoid 2 dairy farms and tie into Trans Canada Trail		To be considered
N11-6	Workshop	Tie into Trans Canada Trail		To be considered
S3-1	Open House	Passing too close, go down the 1/2 mile line on to next road allowance		To be considered
S3-2	Open House	Preferred realignment, avoid valuable land and aerial application		To be considered
S3-3	Open House	Alternative realignment, avoid valuable land and aerial application		To be considered
S3-4	Workshop	Minimize impacts on agriculture and maximize use of ROW/transportation corridors; straight routes preferred. Intent is to parallel road and drain and maintain straight alignment.	Segment between S2 travelling south through La Rochelle area to N11-3 should be eliminated as it travels through a more densely populated area with a large number of homes	Part of alteration noted not to be included in Alternative Route evaluation
S3-5	Workshop	Intent is to avoid landing strip north of the Roseau River Anishinabe First Nation, as well as prime agricultural land.	Crosses Federal Land (Roseau River Anishinabe First Nation)	Not to be included in Alternative Route evaluation
S3-6	Workshop	Better stream crossing point		To be considered
S7-1	Workshop	Intent is to avoid landing strip north of Roseau River Anishinabe First Nation.		To be considered
S7-2	Workshop	Avoid aerial applicator glide path.		To be considered

Table 7.5-2: Proposed Alterations to Alternative Routes

Segment ID-Adjustment ID	Source	Adjustment Consideration	Manitoba Hydro Response	Outcome
S8-1	Open House	No major roads, no homes, less corners, straight away, access is better.	Requires modification to travel west as far as the existing transmission line to Letellier, then parallel into station	To be considered with noted adjustment
S8-2	Open House	Follow rail, no homes, dyke, clear.		To be considered
S8-3	Open House	Line crosses in front of residence, would prefer not straight, has railway trail, why not parallel railway ROW,		To be considered
S8-3	Open House	Realignment supported by another Open House attendee. Avoids homes and yards, a mile is good, also avoids a provincial drain called Arnott Drain.		To be considered
S8-4	Open House	Crossing, area prone to flood, stick to mile roads, coulee is 100' deep, low point of valley, operates as a whole.		To be considered
S8-5	Workshop	Avoid prime agricultural land and aerial applicator landing strip - glide path. Push alignment more into the marginal lands.		To be considered
S8-6	Workshop	Note that if south access to Letellier Station is feasible, avoid PTH 75 route.		To be considered

7.5.2 The Route Evaluation Process

Table 7.5-2 outlines the alterations that were presented to Manitoba Hydro through the Round 1 engagement processes. Those listed as “to be considered” were entered into the route evaluation process as a potential routing option.

These alterations as well as the original route segments were put through the EPRI-GTC methodology, a comparative evaluation using the methodology was conducted and preferred routing options were determined. The following outlines the process in which public engagement feedback was compiled and considered in the determination of the preferred route presented during Round 2.

The route selection process is discussed in detail in Chapter 8.

7.5.2.1 Determination of Community Criteria

Public Engagement Process inputs to the “Community Criteria” used in selecting a Preferred Route for the new St. Vital Station to Letellier Station transmission line were quantified, using a 1 to 3 (best to worst) ranking system. Community rankings were one of the five different criteria (as outlined in Chapter 8) used by Manitoba Hydro in its Preference Determination decision-making process to identify a Preferred Route for the new transmission line from St. Vital Station to Letellier Station.

7.5.2.2 Public Engagement Information Evaluation

Public Engagement inputs to the evaluation of each of the Alternate Route Segments included information related to issues and concerns/constraints and opportunities, and preferences, which were obtained from Key Person Interview summaries, Stakeholder Workshop mapping exercises, Public Open House comment sheets, Public Open House mapping stations, and meetings, emails and telephone calls.

7.5.2.3 Data and Evaluation Approach

For each Alternative Route Segment, including additional segments proposed by Public Engagement participants, information was tabulated related to the following: location, segment designation; and issues and concerns, or constraints with number of participants; and a High, Medium or Low ranking. The approached aimed to aggregate multiple variables collected throughout the public engagement process. Overall numbers of positive or negative responses received for each Alternative Route Segment (preferences); and a ranking scale, or the importance of the issues and concerns identified, sorting for larger and/or more strategic concerns, with consideration of mitigation potential was part of the approach applied to the route evaluation process.

7.5.2.3.1 Ranking Scale

The cumulative ranking was based on a scale of 1 to 3, from best to worst as summarized below.

Rank	Criteria
1	Positive Congruence: • Majority of stakeholder and public responses regarding the route segment were positive, indicating a preference for the route • Few concerns expressed, and only at a local (e.g. individual property) level • Concerns expressed are easily mitigated.
2	Mixed Perspectives: • Mixed perspectives about the route segment, with a number of concerns at the local level, or • Small number of concerns expressed that relate to large or medium scale issues • Concerns identified can be mitigated without major difficulty or cost
3	Multiple Concerns: • Majority of responses were concerns, with a large number of local or medium scale issues expressed, or • One or more major, strategic concerns were expressed • Concerns identified are difficult to mitigate without substantial difficulty and cost

7.5.2.3.2 Issues and Concerns, Constraints and Mitigation Factors

Open House and Workshop participants had various ideas as to what constituted significant issues and concerns, or constraints related to transmission line locations. Few participants explicitly ranked issues and concerns as Low, Medium and High. Examples were provided to assist in ranking route issues and concerns, or constraints by Alternative Route Segment (e.g., High level of concern – aerial applicator land strip location, mitigation – avoid aerial applicator landing strips by at least one mile; Medium level of concern – farmstead locations, mitigation – avoid or relocate farmstead, minimize lengths of lines in proximity; and Low level of concern – concern about views and aesthetics, mitigation – locate towers to minimize impact to views). Mitigation potential was used as a consideration for sorting concerns with major, strategic significance from others.

Mitigation approaches included avoidance, relocation, or engineering and environmental changes or interventions related to the line itself (location, design, placement of structures) or the activities associated with the line (construction timing, activities, identification of sensitive sites and prescribed specific mitigation) compensation was also considered mitigation. A final metric, used to offset local or medium level issues and concerns, was whether the route provided benefits to the surrounding community. Benefits identified included:

- Potential bike path or trail.
- Reduced footprint on agricultural land due to co-location with Municipal or Provincial Roads Highways.
- Proximity to wind turbines to facilitate future connection to the transmission system.

7.5.3 Outcome of Route Evaluation

Public feedback through the various mechanisms in Round 1 were compiled and utilized to assist in the determination of a preferred route for the Project. The preferred route incorporated four (4) segments which were derived from feedback received during Round 1 which were not initially presented to the public. These segments include:

- A segment located north of provincial road 210 (SW of Ile des Chenes).
- A segment south of Ile des Chenes located west of provincial trunk highway 59.
- A segment located northeast of St. Pierre Jolys (east-west alignment).
- A lengthy segment which begins at provincial road 217 and travels south of the community of Dominion City.

These segments were deemed preferred through the evaluation process and made up the preferred route which was presented to the public in Round 2.

Further information regarding the route evaluation process can be found in Chapter 8 of the environmental assessment report.

7.5.4 Feedback and Alterations - Round 2

7.5.4.1 Results of Round 2 Public Engagement

Round 2 of the Public Engagement Process for the St. Vital Transmission Complex obtained comments from over 170 stakeholders and members of the public (148 at Open Houses) about the Preferred Route for the proposed transmission line between St. Vital Station and Letellier Station and the transmission line between La Vernendrye Station and St. Vital Station.

Members of the public and local landowners who attended the Round 2 Public Open House events identified their preferences and concerns related to the Preferred Route through Comment Sheets and providing input at Landowner Information Centres. This included identifying various location-specific constraints impacting the route. Some participants suggested revisions to the proposed alignment to address their concerns and constraints.

Rural Municipal Councils and other landowners provided their input to the Round 2 process at RM and Stakeholder Meetings held with Manitoba Hydro staff.

Other input was received through emails and telephone conversations with stakeholders and landowners along the Preferred Route and members of the public.

Generally, despite some strongly expressed concerns, the southern section of the Preferred Route was more acceptable to local landowners than the Alternative Route Segments presented in Round 1 as it avoided the impact on the landing strip for an aerial applicator servicing most of the local area was avoided, which had been identified in Round 1.

In the north portions of the route, a number of additional constraints were identified in Round 2, including a subdivision in the Grande Pointe area, an airstrip and a private landfill. There were also significant concerns expressed about developing transmission line infrastructure near the RM of Ritchot waste management facility and lagoon.

Residents of Sage Creek were significantly more involved in the Public Engagement Process in Round 2 than they were in Round 1, and their concerns centered on the addition of transmission lines in the existing Manitoba Hydro owned corridor through Sage Creek and associated concerns related to EMF, impacts to property values, aesthetics and existing trails.

As with Round 1, similar concerns were expressed by Open House attendees in Round 2 related to the following: proximity to houses; health/EMF; aesthetics and viewshed; property values; new development; landfill and lagoon expansion; agricultural operations and aerial application, working around towers; livestock/tingle voltage; manure application; and compensation payments.

Round 2 Public Engagement also identified location specific concerns and constraints. While some Open House attendees were happy with the route adjustment made in the south as a direct result of Round 1 input, there was significant concern on the part of other attendees, particularly local landowners who had initially thought that they would be unaffected by the Project. Some less extensive adjustments were proposed in the north to address specific constraints, such as avoiding an airstrip. Other discussions related to modifying tower design and locations to reduce impacts.

7.5.4.2 Meetings and Information Sessions – Round 2

Additional meetings were held between November 5 and 21, 2013, with the municipalities traversed, interest groups, government groups and local landowners.

Feedback received throughout these meetings allowed Manitoba Hydro to consider various mitigation measures to address concerns such as the interference with lagoon and landfill expansion, alternate designs, a desire to review all potential routing options in the RM of De Salaberry, proximity to livestock operations, aircraft landing strips, as well as proximity to homesteads.

7.5.4.3 Community of Sage Creek and Qualico

At the request of the SCRA, an information session was held on December 12, 2013 for Sage Creek Residents hosted by Qualico on the St. Vital Transmission Complex. Residents expressed concerns they were not adequately informed about the development prior to purchasing their homes. Residents also expressed concerns related to perceived health effects associated with EMF, aesthetic impact, safety of recreation in the ROW, and impact to property values. Residents questioned why no alternatives to the route were evaluated and suggested placing lines underground. Manitoba Hydro responded that the route takes advantage of an existing Manitoba Hydro owned ROW and that burying the lines would be more than 10 times the cost of an overhead design.

Throughout the public engagement process, Manitoba Hydro has held meetings with Qualico (primary developer of the community) and the Sage Creek Residents Association (SCRA). Meetings with the SCRA have been focused on the potential construction of the transmission lines, the perceived health effects of high voltage transmission lines by local residents, and the desire for an alternative alignment or an underground option.

7.5.4.4 Public Open House Comment Sheets

Principal concerns were identified from Public Open House comment sheets for specific locations. These concerns related to the following: proximity to residences and a yard site, and EMF concerns; impacts on farmland, proximity to a hog barn, proximity to an airstrip; proximity to a private Class 1 landfill; and impact of multiple (5) power lines.

7.5.4.5 Landowner Information Centres

During Round 2 Public Open Houses, 41 people attended the Landowner Information Centres (LICs) were held in conjunction with the open houses that were held in Dominion City, St. Pierre Jolys and at Ile des Chenes.

Detailed information received at the Open House LICs from the Landowner Information Forms is presented in Appendix D. Specific location information from the forms is provided in Table 9.4 of Appendix D.

7.5.5 Aboriginal Engagement Feedback

7.5.5.1 Feedback from Peguis First Nation

Manitoba Hydro held joint St. Vital Transmission Complex and Manitoba-Minnesota Transmission Project Community Information Sessions in Selkirk and Peguis First Nation. Principle concerns related to the following: engagement methods, environment, vegetation management and routing. The following summary includes comments and concerns pertaining to the Project identified by participants during the Community Information Sessions undertaken for the Project.

Table 7.5-3: Feedback from Peguis First Nation

Category	Community / Participant Comment	MH response
Birds	Can the towers accommodate eagles' nests?	Eagles are known to nest in transmission line towers. Transmission line workers have observed successful hatching and fledging in nests located on transmission line structures. The return of nesting birds each year anecdotally suggests transmission lines do not negatively affect these bird activities.
Burial Site	What happens if MH comes across burial sites?	The Contractor will stop work immediately in the immediate vicinity if human remains are discovered during construction activities. The finding will be reported to the Construction Supervisor/Site Manager who will contact the archaeologist. The archaeologist will report heritage resource discoveries to the appropriate First Nation or Aboriginal community. The archaeologist will visit the site, confirm the presence of heritage resources, establish a buffer zone, conduct an evaluation and determine protection/salvage requirements.
Communication	Concern that the technical wording is very difficult for the community members to understand. There is a request for a simpler method of explaining information to the community members?	Manitoba Hydro is open to working together on how to make the project more understandable for community members.
Compensation	Does Manitoba Hydro offer compensation to land owners?	For the St. Vital Transmission Complex, Manitoba Hydro provides a one-time compensation payment for transmission line easements (75 per cent of market value for 230-kV lines), as well as one-time structure payment related to loss of annual production. Manitoba Hydro also compensates landowners for any damages which may occur through the construction and operation of the line.

Table 7.5-3: Feedback from Peguis First Nation

Category	Community / Participant Comment	MH response
EMFs	Is there a health hazard to working under the lines?	Information will continue to be provided in the public engagement process and these concerns will be addressed in the environmental assessment process. Health Canada, the World Health Organization and other international health entities have noted that no scientific evidence suggests that exposure to EMF will cause any negative health effects on humans, vegetation and wild or domestic animals.Note: There were EMF brochures available at the meeting.
Employment opportunities	Peguis hopes Manitoba Hydro will take a look at First Nations businesses and employees that are able to perform and work for these projects and build capacity.	Manitoba Hydro will let the Transmission Line and Civil Construction Department know about the community's interest in construction for the projects.
Engagement	How does a community become a stakeholder?	Manitoba Hydro invited Peguis to our stakeholder meetings for the Project.
Engagement	Some community members would like to see a video recording of the open house rather than seeing Manitoba Hydro employees taking notes. Community members would like to see the CEOs at community engagement processes and open houses, not underlings.	Manitoba Hydro would take this into consideration if requested before the next meeting.
Environment	Will there be environmental impact on the land or in the future? How is Manitoba Hydro fixing the environmental problems?	There can be impacts related to agricultural lands, wildlife habitat, hunting access, snowmobile and ATV access, which could be considered positive or negative. Especially in areas of caribou and moose, access can be a big concern for these species due to excessive hunting. Manitoba Hydro has to complete Environmental Assessments before any project can be built. This information is considered in the environmental assessment,

Table 7.5-3: Feedback from Peguis First Nation

Category	Community / Participant Comment	MH response
		which includes measures to avoid or mitigate these issues. This goes a long way to ensure best practices are used.
Environment	Is Manitoba Hydro looking into the environmental effects on these projects? The environment is like the First Nations church.	Yes, a lot of projects in the past pre-dated environmental review. This is no longer the case in the modern day with current environmental legislation. The approach to large development has changed dramatically since the times of the Churchill River Diversion.
Heritage	Peguis member mentioned a sacred site near Roseau River. He suggested MH touch base with Roseau River.	Manitoba Hydro will discuss with Roseau River Anishinabe First Nation.
Project need	Will Letellier station be upgraded?	Yes, there will be some improvements done to accommodate the line termination.
Routing	Peguis member asked if the lines to La Verendrye and Letellier are existing corridors.	The line is in an existing corridor from St. Vital to La Verendrye. The lines from St. Vital to Letellier would be partly in an existing corridor.
Routing	Where did MH learn about routing and transmission methodologies? Could MH find a better methodology that was Canadian and that included 'stakeholder engagement' not only at a macro level but at a micro level as well?	MH looked for alternative methodologies with a proven track record. The EPRI-GTC methodology had a proven track record and engaged stakeholders early in the process. MH chose this methodology in part because it engaged FNs early on. This model is constantly adapting.
Routing	How much crown land is 'no go' areas?	Typical 'no go' areas include wildlife protected areas, selected TLEs, Federal land, First Nation reserves. Manitoba Hydro does not avoid Provincial Crown Land.
Towers	Is reliability taken into consideration during tower design? Can the towers and lines withstand extreme weather?	Yes. MH needs towers that can last 60 years plus. MH is in discussions about the design standards. Design options for towers are being reviewed and include building to a one in 100 year event or one in 200 year event.

Table 7.5-3: Feedback from Peguis First Nation

Category	Community / Participant Comment	MH response
Vegetation management	When the line is built will there be vegetation management and what method would that be?	Yes. Manitoba Hydro will not use herbicides to clear the line during construction. For maintenance, Manitoba Hydro uses Integrated Vegetation Management (IVM) that involves a written management plan that utilizes best management practices endorsed by the North American Transmission Forum. Prior to vegetation management, rights of way are patrolled and management methods are selected. Methods are determined according to safety, health, environmental sensitivities, efficiency and cost. Methods of control include chainsaws, brush saws, mechanical mowing/ mulching, herbicide applications, and land-use conversion. Manitoba Hydro will consider non-chemical vegetation management in clearly identified sensitive sites that contain plants of importance to resource harvesters.
Vegetation management	What about the run off for the pesticides? Will the water be affected? Will studies be completed? How far will people be affected?	All herbicide use is reviewed and regulated by the Pesticide Section of the Environmental Assessment and Licencing Branch of Manitoba Conservation. The herbicides are applied by licensed applicators. Manitoba Hydro relies on literature, product labeling and current practice and knowledge for application. Manitoba Hydro will follow conditions included in the Pesticide Use Permit, which are typically 10 m for backpack and 30 m for hose and handgun. Manitoba Hydro typically applies less than the recommended label rate.
Vegetation management	Why doesn’t Manitoba Hydro use brushing techniques? Brushing is more labour intensive but might be worth it to spend a little more on this type of activity instead of using herbicide.	Trimming and cutting while important in maintaining powerline rights-of-way often trade one problem for another. Cutting only removes plant tops (stems, branches and leaves) - the root systems remain intact. This promotes rapid resprouting and spreading of some species. Later, where one tree had grown, several more grow back. Herbicides, on the other hand, control the entire plant (including the roots). This eliminates the need for frequent mechanical treatments, like

Table 7.5-3: Feedback from Peguis First Nation

Category	Community / Participant Comment	MH response
		tree trimming and mowing. Herbicide applications mean less erosion, soil compaction and ruts caused by heavy machinery.
Water	How will the development affect the river banks?	Manitoba Hydro provides project mitigation measures to protect river banks including using buffers and setbacks, erosion and sedimentation control measures and stream crossing measures.

7.5.5.2 Roseau River Anishinabe First Nation

Manitoba Hydro held joint St. Vital Transmission Complex and Manitoba-Minnesota Transmission Complex meetings with Roseau River Anishinabe First Nation representatives. Principle comments and concerns related to the following: engagement methods, environment, vegetation management and routing. The following summary includes comments and concerns pertaining to the Project identified by participants during the meetings undertaken for the Project.

Table 7.5-4: Feedback from Roseau River Anishinabe First Nation

Category	Community / Participant Comment	MH Response
EMFs	Questions about perceived health effects due to electric and magnetic fields (EMF)	Information will continue to be provided in the public engagement process and these concerns will be addressed in the environmental assessment process. Health Canada, the World Health Organization and other international health entities have noted that no scientific evidence suggests that exposure to EMF will cause any negative health effects on humans, vegetation and wild or domestic animals.
Employment opportunities	Are there opportunities for band members?	Manitoba Hydro will let the Transmission Line and Civil Construction Department know about the community's interest in construction for the projects.
Engagement	RRAFN would be interested in having an open house for St. Vital.	Manitoba Hydro will work with the community representative to schedule the open house and can send a draft agenda for the meeting.

Table 7.5-4: Feedback from Roseau River Anishinabe First Nation

Category	Community / Participant Comment	MH Response
	A community representative will attend the Dominion City open house and see which approach would work best for the community.	MH asked the community representative to forward any comments on what would work best for the community's open house.
Engagement	Discussion about importance of meeting with the community. RRAFN indicated it would be great for the community to have an internal meeting regarding the projects before holding an open house. It would be nice to have more people attend	Manitoba Hydro will wait until after the internal meeting is held before proceeding with the open house.
Engagement	Is Manitoba Hydro engaging with all the communities?	Manitoba Hydro is meeting with rural municipalities, towns, First Nation communities, the Manitoba Metis Federation and interested stakeholders. Manitoba Hydro is also holding public open houses and workshops that RRAFN are more than welcome to attend.
Environment	Will Manitoba Hydro look at any of the effects of existing lines?	As part of the environmental assessment process, Manitoba Hydro considers existing lines in close proximity to the project. Monitoring results from previous projects, when conducted, are also taken into consideration.
Routing	A representative shared that they would prefer if the transmission line was close to a highway due to easy access. They also noted that depending on where the transmission line goes, wildlife may diminish.	Existing corridors and linear features were identified as routing opportunities in the route selection process and are being taken advantage of where possible. The environmental assessment process will identify potential environmental sensitivities and will prescribe appropriate mitigation measures.

Table 7.5-4: Feedback from Roseau River Anishinabe First Nation

Category	Community / Participant Comment	MH Response
Routing	If the St. Vital Transmission Project is on the west side of 218, would it be adjacent to the Rapids?	The preferred route is approximately 4 kms to the west of Roseau River Rapids
Timelines	There was discussion about the timelines for both projects.	Manitoba Hydro indicated that they would like to engage the community as early as possible as they are anticipating submitting an Environmental Assessment Report for the St. Vital Transmission Complex in the spring. Manitoba Hydro would like to share information, discuss any concerns and potential routing preferences with the community.
TLE	Does the St. Vital map include TLE lands north of the community?	Manitoba Hydro verified that the community's TLE selections were included.

7.5.6 Outcomes of Round 2 and the Final Preferred Route

Four (4) alterations were considered based on the feedback received throughout Round of the PEP. The rational and decisions made regarding these adjustments are provided below.

Community of Sage Creek and Qualico

The community of Sage Creek and the Sage Creek Residents Association have been in discussions with Manitoba Hydro regarding the Manitoba Hydro owned right-of-way that currently houses an existing transmission line . Many residents requested that an alternative be reviewed which would avoid the communities green space located along the right-of-way owned by Manitoba Hydro. Underground options were also requested by community members as they believed it would minimize impact to property values, EMF exposure and aesthetics.

Manitoba Hydro understands the concerns of the community and has proposed a double circuit structure for one mile through the existing development of Sage Creek. Based on NERC standards, only one mile of double circuit is possible. This alteration to design will provide one row of transmission line towers as opposed to two for one mile (as outlined in the Project Description – Figure:3.2-3).

Manitoba Hydro will continue discussions with the Sage Creek Resident Association and Qualico to continue to address concerns and to provide information as it becomes available.

Airstrip located along PTH 59 near St. Pierre Jolys

An airstrip operator located east of St. Pierre Jolys operated a N/S and E/W strip on the same quarter section. The preferred route would interfere with both strips and was a concern to the owner and others.

This operator provided Manitoba Hydro with 3 potential alternatives to address the concerns they had regarding flight paths and access.

Manitoba Hydro reviewed the three options provided and incorporated the alignment located one mile east of the edge of the quarter section as part of the final preferred route.

Avoidance of the Waste Management Facility in the RM of Ritchot

MidCanada and the RM of Ritchot indicated concerns with the alignment which would have traversed the waste management facility located southwest of Ile des Chenes. Current use and expansion and operation of new cells within the facility would have made traversing the facility difficult. The RM of Ritchot requested that options be reviewed which would avoid the facility and future expansion of the municipal lagoons.

Manitoba Hydro reviewed potential alignments in the area and a route option was determined traveling on the northern boundary of the facility and then heading south along the lagoon. This segment is now part of the final preferred route being presented.

Landowner Request

Two home owners (north of Ile des Chenes) requested a meeting with Manitoba Hydro to discuss the placement of the transmission line in relation to their home. They provided Manitoba Hydro with an alternative which would move the transmission line away from their property lines and be further infield into the adjacent agricultural lands.

Upon review and discussions with the landowners who would house the transmission line infrastructure, this alteration is not part of the final preferred route.

7.5.7 Project Feedback and How Concerns were Addressed

The following sections present a summary of general effects of transmission development identified by participants during the entire PEP undertaken for the Project.

Table 7.5-5: Comments and Concerns

Comment/Concern	How Feedback was Incorporated/addressed
Potential impacts to aerial application	Structure height in agricultural areas will be minimized to the extent possible, consistent with heights of distribution lines. Air strip locations were identified, and avoided where possible in final route selection.
Impacts to agricultural operations	In-field placement was avoided where possible.. A tubular steel H-frame design, which has a smaller footprint than self-supporting or guyed structures, will be utilized to minimize the amount of land taken out of agricultural production.
Impacts to use of GPS units	Manitoba Hydro notes that GPS units function at a very different frequency than AC transmission lines and that there should be no interference with satellite based GPS systems. Manitoba Hydro provided an informational brochure outlining AC lines and electronic devices.
Potential effects on livestock, particularly dairy cattle, e.g., tingle voltage	Tingle voltage tends to occur with faulted distribution lines as opposed to transmission lines. Livestock operators are encouraged to contact Manitoba Hydro if they notice tingle voltage occurring so that the source can be identified.
Loss of high-quality farm land	Wherever possible the route was located adjacent to road allowances to minimize the land area used for the transmission line and the related impact on farming activities. See also Landowner Compensation below.
Landowner compensation	Manitoba Hydro provides a one-time compensation payment for transmission line easements (75 per cent of market value for 230-kV lines), as well as one-time structure payment related to loss of annual production. Manitoba Hydro also compensates landowners for any damages which may occur through the construction and operation of the line.
Proximity to farmsteads and shelterbelts	During routing, Manitoba Hydro avoids residences and shelterbelts to the extent possible. Shelterbelts that are not avoided will be replaced by Manitoba Hydro, with a new location determined in discussion with the landowner.
Some areas are flood prone	The potential for flooding was taken into account but does not hinder design, construction or operation of the transmission line.
Locate transmission lines within existing Hydro transmission line corridors	Where possible the line(s) are located in existing, Manitoba Hydro owned or eased rights of way. For example, a portion of the line passing through Sage Creek is in an existing Manitoba Hydro owned corridor as is the Southern Loop that extends from St. Vital Station to La Verendrye Station.

Table 7.5-5: Comments and Concerns

Comment/Concern	How Feedback was Incorporated/addressed
Locate transmission line infrastructure adjacent to linear infrastructure such as provincial and municipal highways, roads and drains in order to reduce land requirements	Existing corridors and linear features were identified as routing opportunities in the route selection process and are being taken advantage of where possible. Manitoba Hydro will consult with Manitoba Infrastructure and Transportation (MIT) on future planning before finalizing alignments near PTH 75, PTH 59 and PTH 52.
Minimize transmission line crossings of major highways and rail lines, as well as stream crossings; concern that stream crossings could impact riparian habitat	Such crossings, which require higher and more costly towers, were minimized where possible.
Avoid rural residential developments, as well as commercial and industrial development	Locations of rural residential, commercial and industrial development areas were identified and are avoided where possible.
Avoid landfills and lagoons, and cemeteries	Locations of landfills, lagoons and cemeteries were noted. Structure placement will avoid these areas. A re-alignment to the route was added during Round 2 to avoid the newly expanded Ritchot Waste Management facility.
Transmission tower aesthetics	Towers that will be placed adjacent to existing towers, such as along the Southern Loop, will have similar spacing and heights wherever possible. In some cases, in order to meet industry standards this is not possible.
Potential impact on wildlife, including birds, vegetation, riparian area, endangered species and wetlands	The environmental assessment process will identify potential environmental sensitivities and will prescribe appropriate mitigation measures.
Concern that construction will disrupt fur-bearing animals and affect trapping	The environmental assessment process will identify potential sensitivities related to fur-bearing animals and will prescribe appropriate mitigation measures such as modifications to construction scheduling.
Avoid heritage sites	The environmental assessment process will identify heritage resources, including archaeological sites, which will be avoided where possible.
Perceived health effects due to electric and magnetic fields (EMF)	Information will continue to be provided in the public engagement process and these concerns will be addressed in the environmental assessment process. Health Canada, the World Health Organization and other international health entities have noted that no scientific evidence suggests that exposure to EMF will cause any negative health effects on humans, vegetation and wild or domestic animals.

Table 7.5-5: Comments and Concerns

Comment/Concern	How Feedback was Incorporated/addressed
Transmission line rights-of-way become areas for growth of noxious weeds and potential bio-security issues	Manitoba Hydro will take necessary precautions as part of construction of the project to minimize the risk of invasive plants and diseases spreading. Manitoba Hydro has a bio-security policy.
Noise, dust and disruption of traffic, particularly related to emergency services, during construction	Construction operations will minimize noise and dust. Construction traffic routes and detours will be identified and made available to local police, fire and emergency services.
City, municipal and business and industry stakeholders, in particular, noted beneficial effects of a more secure power supply on their operations and growth. Agricultural stakeholders also noted that they are impacted by electrical power system reliability.	The beneficial effect on power system reliability and capacity is a fundamental reason for this project.

7.6 PUBLIC ENGAGEMENT IDENTIFICATION OF VALUED COMPONENTS (VCS)

The PEP activities undertaken for the project had an influence on the environmental assessment process. Comments received from the public and stakeholders were gathered and given consideration and addressed in the effects assessment. The public comments are summarized by the valued components identified for the Project in the sections below.

7.6.1 Atmospheric Environment

No concerns regarding air quality were raised during any of the public engagement events undertaken for this Project.

7.6.2 Groundwater Resources (Physical)

No input pertaining to project effects on Shallow Groundwater Resources was received from the public engagement activities.

7.6.3 Aquatic Resources

During the Key Person Interview process for the Project, concerns were raised regarding certain aquatic issues such as:

- Important streams and wetlands, wildlife and fish habitat: Red River Corridor/St. Adolphe PR 210 bridge, Brokenhead Swamp, Rat River, Joubert Creek, Kirkpatrick Swamp and Roseau River.
- Flooding on local watercourses, including: Seine River, Manning Canal and Youville Drain.

The watercourses noted above have importance to the local residents.

As well, during the Stakeholder Workshop at Mitchell, a representative of the Seine-Rat River Conservation District was present. They indicated that most local conservation projects were located in the headwaters of those watercourses and were located away from the Project development area.

7.6.4 Wildlife: Birds

A number of bird-related concerns were identified by Workshop participants. These included:

- East-west orientation of transmission lines should be avoided as much as possible due to impacts on migratory birds.
- Bird diverters should be used to keep birds away from transmission lines

7.6.5 Wildlife: Mammals

The public engagement activities, including stakeholder workshops and First Nations engagement, revealed the importance of natural resource use by First Nations groups and others; this includes hunting of ungulates and trapping of fur-bearers.

7.6.6 Species of Conservation Concern

None of the concerns or issues raised during the public engagement process (i.e., stakeholder workshops and public open house events) related to species of conservation concern.

7.6.7 Natural Vegetation

Effects on natural vegetation were noted as a concern during the public engagement process. Suggested mitigation strategies included site reclamation with native species.

Other considerations related to preservation of shelterbelts and tree lines.

Open house participants were also concerned about the spread of noxious weed in agricultural areas. Residents highlighted the importance of following the Manitoba *Noxious Weeds Act* (2010).

7.6.8 Traditional Land Use and Resource Use

Leadership meetings provided opportunities for early and ongoing involvement regarding the proposed Project and were held with interested communities to communicate Project activities, receive feedback, and discuss engagement plans and concerns including traditional land use and resource use.

Community Information Sessions provided Peguis First Nation with an opportunity to access information and to provide feedback regarding the Project to Manitoba Hydro representatives. This method of communication also provided an opportunity for direct discussions with community members including concerns about traditional land use and resource use.

Manitoba Hydro continues to seek meetings with various groups including Roseau River Anishinabe First Nation, Peguis First Nation and the Manitoba Metis Federation to share information and potentially inform the Environmental Protection Plan for the Project. If the project proceeds, Manitoba Hydro will offer to hold Environment Protection Program meetings with communities that have expressed an interest in receiving updates on the Project.

7.6.9 Infrastructure and Services

Concerns regarding the environmental effects of the Project on Infrastructure and Services were identified during the PEP. Potential issues and questions associated with the potential effects of the Project on local infrastructure and services are primarily associated with routing and how the eventual presence of the transmission line may overlap physically with existing infrastructure. Comments included the following issues and concerns:

- Transmission line alignment
- Highway crossings
- Proximity to landfills and lagoons
- Proximity to cemeteries
- Proximity to runways particularly those used by aerial applicators

7.6.10 Employment, Business Opportunities and Economy

Based on previous experience with similar projects and discussions during the Project PEP, issues and concerns related to Employment, Business Opportunities and Economy included:

- The availability of, and access to, jobs and business opportunities.

- Development of employment and business preferences for local communities.

7.6.11 Property and Residential Development

Concerns regarding the environmental effects of the Project on Property and Residential Development were identified during the PEP. Issues and questions associated with the potential effects of the Project on Property and Residential Development are primarily associated with routing and how the eventual presence of the transmission line may overlap physically with property within the study area. Comments included the following issues and concerns:

- The possibility of property values declining.
- Aesthetics of towers close to rural residential development (see Section 9.15).
- Proximity of the Project to future residential development.
- Difficult in flood prone areas to relocate residences due to the cost of building up land to flood protection elevations.
- Proximity of the Project to farmstead locations.

7.6.12 Agricultural Land Use

Concerns regarding the environmental effects of the Project on Agricultural Land Use were identified during the PEP. The greatest number of concerns was directly related to agriculture. Potential issues and questions associated with the potential effects of the Project on Agricultural Land Use are primarily associated with how construction-related activities and the eventual presence of the transmission system may overlap physically with existing Agricultural Land Uses. Comments focused on potential adverse effects of transmission towers and lines on agricultural operations and included:

- Aerial spraying of crops
- Operating farm equipment around towers
- Nuisance of farming around towers
- Loss of valuable land for production
- Impacts on livestock, particularly dairy cattle
- Impacts on GPS units used in farming

7.6.13 Non-agricultural Land Use

Potential issues and questions associated with the potential effects of the Project on Non-Agricultural Land Use were identified through the PEP. Relevant issues are associated with how construction-related activities and the eventual presence of the transmission system, may overlap physically with existing land uses on the landscape, as well as how Project activities and components may generally disturb and affect the quality of the environment and enjoyment of outdoor pursuits.

Specific concerns raised related to habitat alteration and potential effects on trails and bird watching.

7.6.14 Communities

Concerns regarding the environmental effects of the Project on Communities were identified during the PEP. Potential issues and questions associated with the potential effects of the Project on Communities were primarily associated with Aesthetics, Public Safety and Human Health. Specific comments included the following issues and concerns:

- Concerns regarding the aesthetics of towers close to rural residential development.
- Health concerns were primarily related to Electric and Magnetic Field (EMF) issues.

7.6.15 Heritage Resources

No concerns regarding the potential for the Project to effect intact heritage resources from the Pre-contact and Historic Period, and paleontological sites were identified during the PEP.

7.7 CONCLUSION

The PEP undertaken for the Project provided many mechanisms to gather feedback and share information with the public. Using a variety of notification methods and offering information through email, website, phone lines and open houses allowed the public to participate in a manner which they deemed preferable.

The goals of the PEP were met by:

- Share information as it becomes available – a website was developed to ensure up to date information and public materials were accessible to those who were unable to attend an open house. The email address and manned phone line also provided information at their request.
- Obtain feedback for use in the assessment process – feedback received was incorporated into the route selection and environmental assessment process. Site specific concerns, alterations, and mitigation measures were gathered through all mechanisms of the PEP.
- Gather and understand local interests – site specific concerns were collected and assisted in the determination of a final preferred route for the Project. Local interests and knowledge

assisted the project team in understanding the concerns and developing methods to avoid or minimize impact to local values.

- Integrate interests and concerns into the assessment process – the environmental assessment process including VC determination.
- Discuss potential mitigation measure – workshops and open houses provided opportunity for participants to share their views regarding mitigation which included avoidance, design modifications and routing modifications to minimize impact to people and the environment.

The information line and email address are still monitored and questions and comments are still addressed. The information line and email will remain operational throughout the construction of the Project. The website will also be kept up to date with information as new information becomes available to provide a mechanism for interested parties to stay informed of Project related activities.

8.0 IDENTIFICATION AND EVALUATION OF ALTERNATIVE ROUTES

8.1 INTRODUCTION

Manitoba Hydro elected to conduct a route selection study to determine the preferred route for the proposed St. Vital to Letellier 230-kV transmission line. The route was required to pass near to the town of Grunthal, in the Rural Municipality of Hanover, in order to accommodate future development.

The route selection study identified a preferred route for the proposed transmission line that considered many factors, including existing land use, special land use classifications (e.g., national or provincial parks, federal Lands, floodplains, wetlands, etc.), cultural resources, and threatened and endangered species and their habitat.

The EPRI-GTC Overhead Electric Transmission Line Routing Methodology (EPRI-GTC 2006) was the basis for the route selection process.

8.2 EPRI-GTC METHODOLOGY

The EPRI-GTC Methodology is a quantitative, computer-based methodology developed by the Electric Power Research Institute (EPRI) and Georgia Transmission Corporation (GTC) for use as a tool in evaluating the suitability of an area for locating new overhead transmission lines. Based on this suitability analysis, macro corridors are created which define the study area. Using more detailed information, alternate corridors are then developed. Within the alternate corridors, alternate routes are identified and analyzed. The analysis results in the selection of a preferred route.

The EPRI-GTC Methodology was applied as it provides an objective, comprehensive, and quantitative approach for routing transmission lines. Employing increasingly detailed data focused on areas of greater suitability, the Methodology allows Manitoba Hydro to take into consideration large amounts of information and to quantitatively consider stakeholder input during project development. Figure 8.2-1 shows the overall components and process of the EPRI-GTC Methodology.

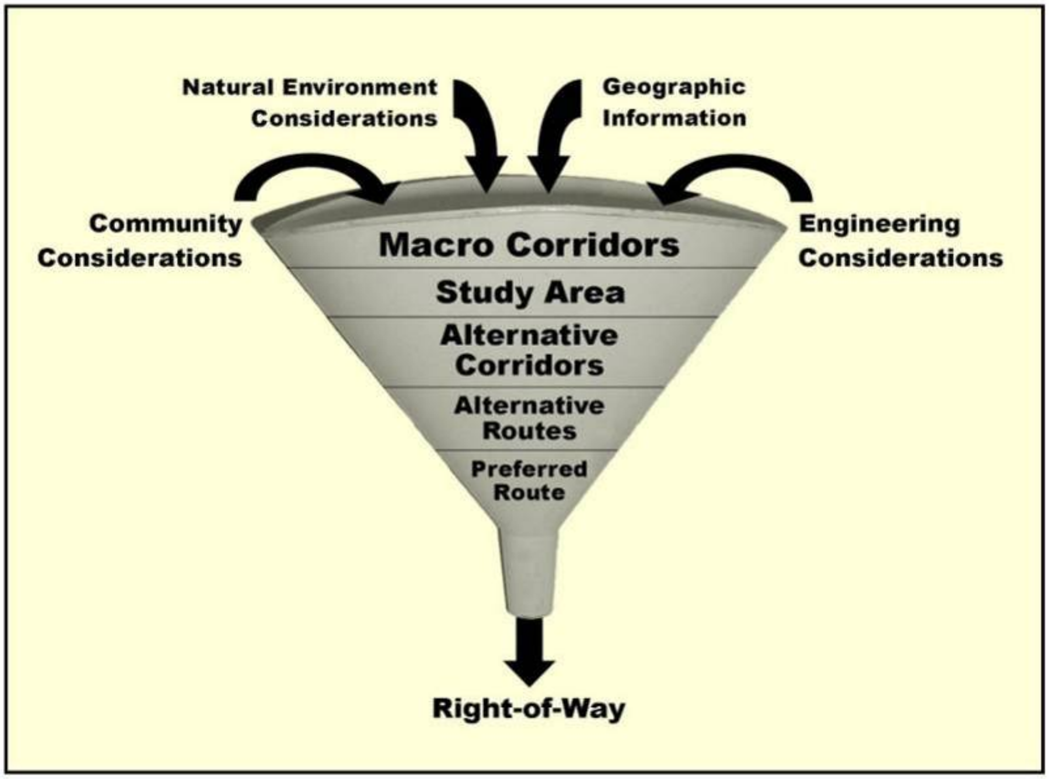


Figure 8.2-1: EPRI-GTC Methodology

The EPRI-GTC Methodology considers three broadly conceived perspectives plus a fourth perspective that considers the other three equally:

- **Built Environment Perspective,** which is concerned with minimizing the impact on the socioeconomic environment.
- **Natural Environment Perspective,** which is concerned with minimizing the impact on the biophysical environment.
- **Engineering Environment Perspective,** which is concerned with co-location, minimizing overall cost, and considering physical restraints.
- **Simple Average,** which considers the three perspectives equally important.

The first step in the EPRI-GTC Methodology is to develop Macro Corridors, which are used to help define a study area between the endpoints of the study.

The next step is to produce four Alternate Corridors (Built Environment, Natural Environment, Engineering Environment, and Simple Average) that represent different perspectives. Features are identified and evaluated in order to map the suitability of areas within the Project Study Area for locating a transmission line. The most suitable areas are assembled into Alternate Corridors.

Once Alternate Corridors are identified, the project team identifies Alternate Routes within those corridors. The Alternate Routes are potential, preliminary centerline paths for the proposed transmission line that can be analyzed by the project team. Hydro developed numerous alternate route possibilities. The alternate routes were evaluated and ranked, and then a preferred route was selected.

The following sections further explain the process followed to generate the Preferred Route.

8.3 MACRO CORRIDORS

The first step in the EPRI-GTC Methodology is to develop Macro Corridors, which are used to help define the Project Study Area. A waypoint at Grunthal was established for the project as this is the site of a potential future electrical station. Therefore the project was considered in two portions, the St Vital to Grunthal portion and the Grunthal to Letellier portion. For this stage of the process the best available land cover dataset was used. This data, based on 30 meter (m) Landsat imagery (captured in 2005), was used to develop the Macro Corridors. Areas adjacent to roads and transmission lines suitable for paralleling were added. Values were assigned based on the Manitoba Hydro Macro Corridor Model (Table 8.3-1). Smaller values represent more suitable areas, and higher values represent less suitable areas for routing a transmission line.

Three Macro Corridors were created for each portion of the project, St Vital to Grunthal, and Grunthal to Letellier. Each of the three Macro Corridors corresponds to a set of weighting designed to emphasize certain parameters that are often used to delineate a study area for a new transmission line project: cross country, paralleling roads, and paralleling transmission lines. The combined geographic area of these Macro Corridors was reviewed by the MH project team.

Table 8.3-1: Macro Corridor Model Scores for Various LandSat Data Features

Generalized Types	Cross Country	Roads	Transmission Lines
Agriculture	6	6	6
Forest	3	3	3
Named Roads	5	1	5
Barren Non-vegetated	1	2	2
Open Land	3	3	3
Open Water	7	7	7

Table 8.3-1: Macro Corridor Model Scores for Various LandSat Data Features

Generalized Types	Cross Country	Roads	Transmission Lines
Shrubland	2	2	2
Snow/Ice	9	9	9
Rock	1	2	2
Transmission Corridors	5	5	1
Urban	9	9	9
Wetland	6	6	6

Lower values = more suitable, higher values = more suitable

8.4 STUDY AREA

The next step is to create a study area from the Macro Corridors. Adjustments to the Macro Corridors were made using knowledge and experience to create the Project Siting Study Area (Map 1-1). The result was a study area approximately 2,356.5 km² in size. The majority of the study area is agricultural and grazing lands. Exceptions include development associated with Winnipeg in the northern end of the study area, the forested and marsh lands in the eastern and southeastern portions of the study area, and the numerous small towns and communities throughout the area. The St Vital end point was selected near the southeastern quadrant of the intersection of the Trans Canadian Highway's southern perimeter with Provincial Highway 59/300. This point is at the southern end of an existing transmission line corridor with sufficient ROW to support the construction of this new project. The Grunthal waypoint is located to the west of the community of Grunthal. Finally, the Letellier endpoint is the existing Letellier substation location near the community of the same name.

8.5 ALTERNATE CORRIDORS

Once the Project Study Area was identified, detailed dataset layers were obtained for use in the development of the Alternate Corridors. Using these detailed layers, Alternate Corridors were generated. For the purposes of this route selection, the Project Study Area represents a large land area between the three project end points through which corridors, defined as the most suitable areas for routing a transmission line within the Study Area, can be identified. Corridors will vary depending upon the resources encountered within the Project Study Area.

The Alternate Corridor Evaluation Model, used to develop the alternate corridors for the project, was developed using input from stakeholders during workshops conducted May 6-May 8, 2013. The stakeholders represented a broad range of interests including environmental groups

(Nature Conservancy, Ducks Unlimited Canada), community groups (Manitoba Trappers Association, Manitoba Trails Association), agricultural groups (ex. Keystone Agricultural Producers), government agencies (ex. Wildlife Branch), and technical representatives (Manitoba Infrastructure and Transportation staff, Manitoba Hydro design and construction engineers).

A model based on the stakeholders' preferences was developed to represent the suitability of features on the landscape in southern Manitoba for transmission line routing. The resulting model (Table 8.5-1) includes data layers, features, layer weights, and suitability values. Based on each stakeholder's field of expertise or expressed interest, each was assigned to a breakout group for one of the three perspectives (Built, Natural or Engineering Environment). Guided by workshop facilitators, each group identified a set of data layers (shown in green in Table 8.5-1), component features (shown in yellow), and areas of least preference (shown in red). For example, a data layer in the Engineering perspective is "Proximity to Future Wind Farms," which has two component features: 500 m-10k, and >10k.

For each feature, the stakeholders then used a modified Delphi process, a consensus-building technique, to develop a relative suitability value for each component feature. Numbers between 1 and 9 were used to represent degrees of suitability for routing a transmission line across (or in proximity to) this feature, with 1 being most suitable and 9 being least suitable. These values are described in the EPRI-GTC Methodology (2006) as follows:

Areas that have High Suitability for an Overhead Electric Transmission Line (1, 2, 3) – These areas do not contain known sensitive resources or physical constraints, and therefore should be considered as suitable areas for the development of corridors.

Moderate Suitability for an Overhead Electric Transmission Line (4, 5, 6) – These areas contain resources or land uses that are moderately sensitive to disturbance or that present a moderate physical constraint to overhead electric transmission line construction and operation. Resource conflicts or physical constraints in these areas can generally be reduced or avoided using standard mitigation measures.

Low Suitability for an Overhead Electric Transmission Line (7, 8, 9) – These areas contain resources or land uses that present a potential for significant impacts that may not be readily mitigated. Locating a transmission line in these areas would require careful routing or special design measures. While these areas can be crossed, it is not desirable to do so if other, more suitable alternatives are available.

After assigning suitability values to features, stakeholders then assigned weights to each data layer based on their opinion of its relative importance in the routing process. This was accomplished by conducting pair-wise comparisons employing the Analytic Hierarchy Process[15].

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[15] The Analytic Hierarchy Process is a structured technique for organizing and analyzing complex decisions, based on mathematics and psychology. It was developed by Tomas Saaty in the 1970's. ATP has a particular application in group decision making. AHP users first decompose their decision to a series of pair-wise comparisons of each subcomponent of the problem. In the case of the routing model, these subcomponents are features within each layer. A numerical weight is derived for each element, resulting in the

The result was a percentage weighting for each data layer within each perspective, with all data layers within each perspective totaling 100 percent.

Areas of Least Preference are features to avoid when routing a transmission line due to physical constraints (extreme slopes, long water crossings), regulations limiting development (protected areas), or areas that would require extensive mitigation or compensation. Features that constitute areas of least preference were determined by the stakeholder groups and are listed in red in Table 8.5-1.

8.5.1 Suitability Mapping

Suitability Mapping begins with mapping the two endpoints and the Grunthal waypoint, using ArcGIS software. The Project Study Area is divided into grid cells that are 5-m x 5-m in size.

Data from aerial photography, geographic information systems, publicly available datasets, and other sources are used to identify features within each grid cell. Based on these features and the suitability values and data layer weights assigned in the Alternate Corridor Model workshops, the model assigns an overall suitability value to each cell.

The methodology employs an algorithm that seeks to minimize the sum total of values as it works its way from one endpoint to the other, as lower values indicate higher suitability. The result is referred to as the “optimal path”.

Figure 8.5-1 demonstrates the development of a sample “optimal path” using information from a hypothetical situation. Figure 8.5-1(a) displays an example area that has four features: an existing transmission line through the center of the area, surrounded by agricultural land with an area of steep slopes to the northwest and a floodplain to the southeast.

In Figure 8.5-1(b), grid cells are overlaid and assigned suitability values based on the features. The suitability values used in this example do not necessarily correspond to the Alternate Corridor Evaluation Model. The area of the existing line is considered highly suitable, the agricultural land is moderately suitable, and the steep slopes and floodplains have lower suitability values.

Finally, Figure 8.5-1(c) shows in darker green the most suitable corridor through the area for locating a transmission line. Light green areas are moderately suitable. The orange area has a low suitability value, and the red area is highly unsuitable. The most suitable corridor from east to west in this example is the one that follows the existing transmission line.

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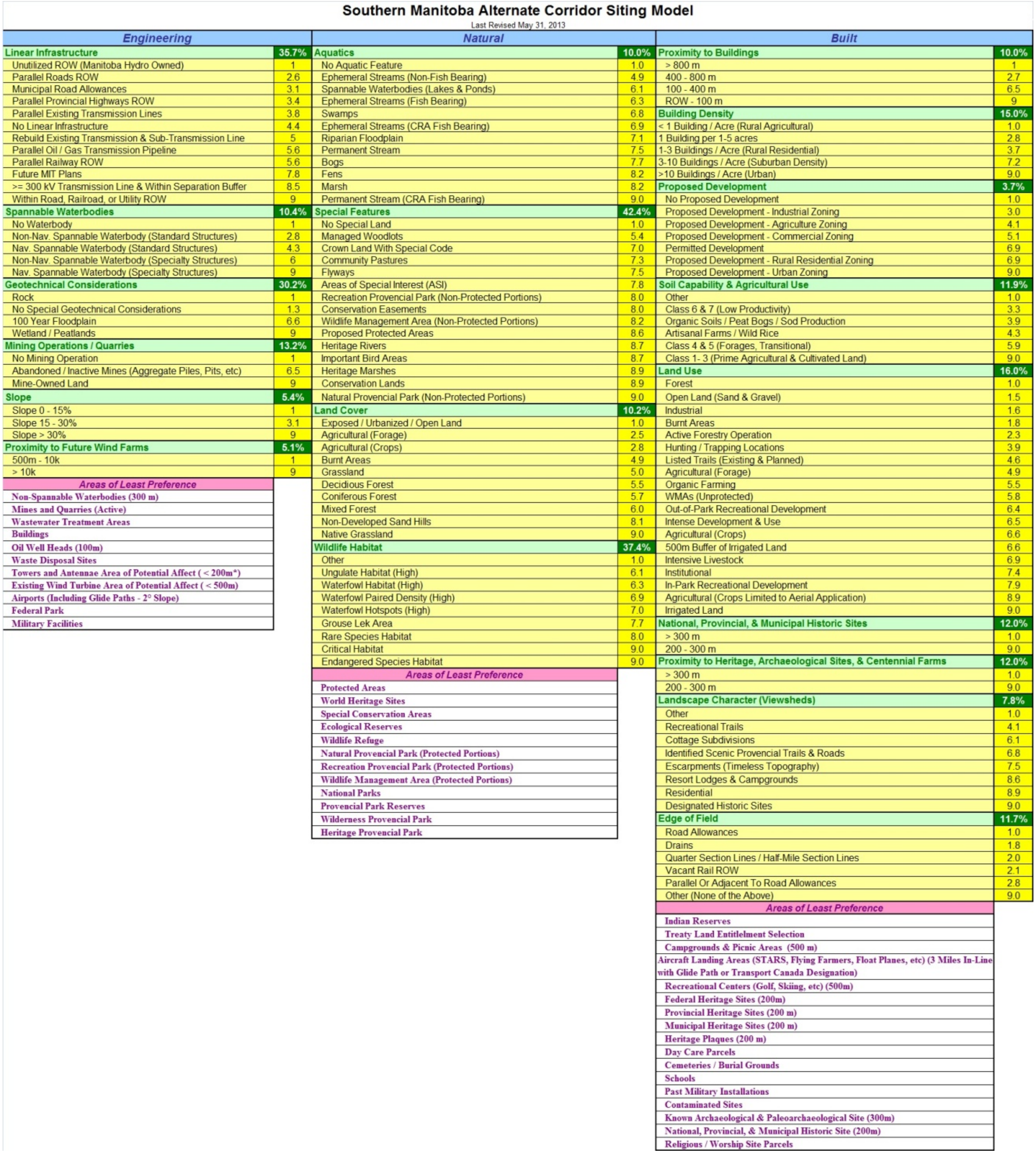
weight of the layer within its perspective these subcomponents are features within each layer. A numerical weight is derived for each element, resulting in the weight of the layer within its perspective.

Table 8.5-1: Manitoba Hydro Southern Manitoba EPRI-GTC Model



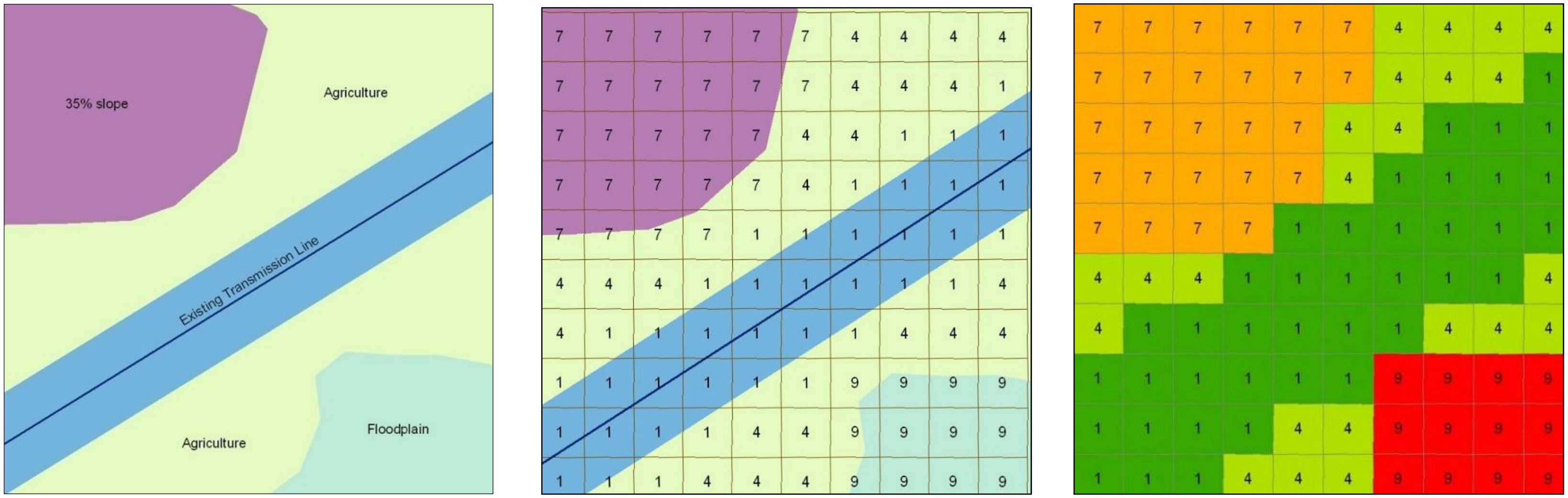
Southern Manitoba Alternate Corridor Siting Model

Last Revised May 31, 2013

Engineering	
Linear Infrastructure	**35.7%**
Unutilized ROW (Manitoba Hydro Owned)	1
Parallel Roads ROW	2.6
Municipal Road Allowances	3.1
Parallel Provincial Highways ROW	3.4
Parallel Existing Transmission Lines	3.8
No Linear Infrastructure	4.4
Rebuild Existing Transmission & Sub-Transmission Line	5
Parallel Oil / Gas Transmission Pipeline	5.6
Parallel Railway ROW	5.6
Future MIT Plans	7.8
>= 300 kV Transmission Line & Within Separation Buffer	8.5
Within Road, Railroad, or Utility ROW	9
Spannable Waterbodies	**10.4%**
No Waterbody	1
Non-Nav. Spannable Waterbody (Standard Structures)	2.8
Nav. Spannable Waterbody (Standard Structures)	4.3
Non-Nav. Spannable Waterbody (Specialty Structures)	6
Nav. Spannable Waterbody (Specialty Structures)	9
Geotechnical Considerations	**30.2%**
Rock	1
No Special Geotechnical Considerations	1.3
100 Year Floodplain	6.6
Wetland / Peatlands	9
Mining Operations / Quarries	**13.2%**
No Mining Operation	1
Abandoned / Inactive Mines (Aggregate Piles, Pits, etc)	6.5
Mine-Owned Land	9
Slope	**5.4%**
Slope 0 - 15%	1
Slope 15 - 30%	3.1
Slope > 30%	9
Proximity to Future Wind Farms	**5.1%**
500m - 10k	1
> 10k	9
Areas of Least Preference	
Non-Spannable Waterbodies (300 m)	
Mines and Quarries (Active)	
Wastewater Treatment Areas	
Buildings	
Oil Well Heads (100m)	
Waste Disposal Sites	
Towers and Antennae Area of Potential Affect (< 200m*)	
Existing Wind Turbine Area of Potential Affect (< 500m)	
Airports (Including Glide Paths - 2° Slope)	
Federal Park	
Military Facilities	

Natural	
Aquatics	**10.0%**
No Aquatic Feature	1.0
Ephemeral Streams (Non-Fish Bearing)	4.9
Spannable Waterbodies (Lakes & Ponds)	6.1
Ephemeral Streams (Fish Bearing)	6.3
Swamps	6.8
Ephemeral Streams (CRA Fish Bearing)	6.9
Riparian Floodplain	7.1
Permanent Stream	7.5
Bogs	7.7
Fens	8.2
Marsh	8.2
Permanent Stream (CRA Fish Bearing)	9.0
Special Features	**42.4%**
No Special Land	1.0
Managed Woodlots	5.4
Crown Land With Special Code	7.0
Community Pastures	7.3
Flyways	7.5
Areas of Special Interest (ASI)	7.8
Recreation Provencial Park (Non-Protected Portions)	8.0
Conservation Easements	8.0
Wildlife Management Area (Non-Protected Portions)	8.2
Proposed Protected Areas	8.6
Heritage Rivers	8.7
Important Bird Areas	8.7
Heritage Marshes	8.9
Conservation Lands	8.9
Natural Provencial Park (Non-Protected Portions)	9.0
Land Cover	**10.2%**
Exposed / Urbanized / Open Land	1.0
Agricultural (Forage)	2.5
Agricultural (Crops)	2.8
Burnt Areas	4.9
Grassland	5.0
Decidious Forest	5.5
Coniferous Forest	5.7
Mixed Forest	6.0
Non-Developed Sand Hills	8.1
Native Grassland	9.0
Wildlife Habitat	**37.4%**
Other	1.0
Ungulate Habitat (High)	6.1
Waterfowl Habitat (High)	6.3
Waterfowl Paired Density (High)	6.9
Waterfowl Hotspots (High)	7.0
Grouse Lek Area	7.7
Rare Species Habitat	8.0
Critical Habitat	9.0
Endangered Species Habitat	9.0
Areas of Least Preference	
Protected Areas	
World Heritage Sites	
Special Conservation Areas	
Ecological Reserves	
Wildlife Refuge	
Natural Provencial Park (Protected Portions)	
Recreation Provencial Park (Protected Portions)	
Wildlife Management Area (Protected Portions)	
National Parks	
Provencial Park Reserves	
Wilderness Provencial Park	
Heritage Provencial Park	

Built	
Proximity to Buildings	**10.0%**
> 800 m	1
400 - 800 m	2.7
100 - 400 m	6.5
ROW - 100 m	9
Building Density	**15.0%**
< 1 Building / Acre (Rural Agricultural)	1.0
1 Building per 1-5 acres	2.8
1-3 Buildings / Acre (Rural Residential)	3.7
3-10 Buildings / Acre (Suburban Density)	7.2
>10 Buildings / Acre (Urban)	9.0
Proposed Development	**3.7%**
No Proposed Development	1.0
Proposed Development - Industrial Zoning	3.0
Proposed Development - Agriculture Zoning	4.1
Proposed Development - Commercial Zoning	5.1
Permitted Development	6.9
Proposed Development - Rural Residential Zoning	6.9
Proposed Development - Urban Zoning	9.0
Soil Capability & Agricultural Use	**11.9%**
Other	1.0
Class 6 & 7 (Low Productivity)	3.3
Organic Soils / Peat Bogs / Sod Production	3.9
Artisanal Farms / Wild Rice	4.3
Class 4 & 5 (Forages, Transitional)	5.9
Class 1- 3 (Prime Agricultural & Cultivated Land)	9.0
Land Use	**16.0%**
Forest	1.0
Open Land (Sand & Gravel)	1.5
Industrial	1.6
Burnt Areas	1.8
Active Forestry Operation	2.3
Hunting / Trapping Locations	3.9
Listed Trails (Existing & Planned)	4.6
Agricultural (Forage)	4.9
Organic Farming	5.5
WMAs (Unprotected)	5.8
Out-of-Park Recreational Development	6.4
Intense Development & Use	6.5
Agricultural (Crops)	6.6
500m Buffer of Irrigated Land	6.6
Intensive Livestock	6.9
Institutional	7.4
In-Park Recreational Development	7.9
Agricultural (Crops Limited to Aerial Application)	8.9
Irrigated Land	9.0
National, Provincial, & Municipal Historic Sites	**12.0%**
> 300 m	1.0
200 - 300 m	9.0
Proximity to Heritage, Archaeological Sites, & Centennial Farms	**12.0%**
> 300 m	1.0
200 - 300 m	9.0
Landscape Character (Viewsheds)	**7.8%**
Other	1.0
Recreational Trails	4.1
Cottage Subdivisions	6.1
Identified Scenic Provencial Trails & Roads	6.8
Escarpments (Timeless Topography)	7.5
Resort Lodges & Campgrounds	8.6
Residential	8.9
Designated Historic Sites	9.0
Edge of Field	**11.7%**
Road Allowances	1.0
Drains	1.8
Quarter Section Lines / Half-Mile Section Lines	2.0
Vacant Rail ROW	2.1
Parallel Or Adjacent To Road Allowances	2.8
Other (None of the Above)	9.0
Areas of Least Preference	
Indian Reserves	
Treaty Land Entitlelment Selection	
Campgrounds & Picnic Areas (500 m)	
Aircraft Landing Areas (STARS, Flying Farmers, Float Planes, etc) (3 Miles In-Line with Glide Path or Transport Canada Designation)	
Recreational Centers (Golf, Skiing, etc) (500m)	
Federal Heritage Sites (200m)	
Provincial Heritage Sites (200 m)	
Municipal Heritage Sites (200 m)	
Heritage Plaques (200 m)	
Day Care Parcels	
Cemeteries / Burial Grounds	
Schools	
Past Military Installations	
Contaminated Sites	
Known Archaeological & Paleoarchaeological Site (300m)	
National, Provincial, & Municipal Historic Site (200m)	
Religious / Worship Site Parcels	



A) Feature Map of Example Area

7	7	7	7	7	7	4	4	4	4
7	7	7	7	7	7	4	4	4	1
7	7	7	7	7	4	4	1	1	1
7	7	7	7	7	4	1	1	1	1
7	7	7	7	1	1	1	1	1	1
4	4	4	1	1	1	1	1	1	4
4	1	1	1	1	1	1	4	4	4
1	1	1	1	1	1	9	9	9	9
1	1	1	1	4	4	9	9	9	9
1	1	1	4	4	4	9	9	9	9

B) GRID CELL MAP OF EXAMPLE AREA WITH SUITABILITY VALUES

7	7	7	7	7	7	4	4	4	4
7	7	7	7	7	7	4	4	4	1
7	7	7	7	7	4	4	1	1	1
7	7	7	7	7	4	1	1	1	1
7	7	7	7	1	1	1	1	1	1
4	4	4	1	1	1	1	1	1	4
4	1	1	1	1	1	1	4	4	4
1	1	1	1	1	1	9	9	9	9
1	1	1	1	4	4	9	9	9	9
1	1	1	4	4	4	9	9	9	9

C) FEATURE MAP OF EXAMPLE AREA

Figure 8.5-1: Development of the Optimal Path

8.5.2 Developing Alternate Corridors

The suitability map is used to create the alternate corridors. The Alternate Corridors developed from the model represent the top three percent (the most suitable three percent) of “optimal paths” within the Project Study Area, where each route is a string of 5m square grid cells connecting the three endpoints of the project.

Alternate Corridors are generated for each of the three perspectives (Built Environment, Natural Environment, and Engineering Considerations). When generating Alternate Corridors for each perspective, the data layers from the other two perspectives are taken into account. However, the target perspective is emphasized by weighting it more heavily (five times) than the values and weights from the other perspectives. The final step in generating Alternate Corridors is to equally weigh the three perspectives and generate a fourth corridor referred to as the Simple Average Alternate Corridor.

The combination of the four Alternate Corridors results in the Composite Corridor. The Composite Corridor depicts the areas of greatest suitability in which to construct a transmission line. The following sections provide details of the original Alternate Corridor Evaluation models for each perspective as well as the adjusted models. Each model and sub-model must be adjusted based on the contents of the Project Study Area for a particular project. When a feature or layer is absent, the weights are adjusted accordingly and evenly across the remaining features or layers.

8.5.2.1 Engineering Considerations

The Engineering Environment sub-model of the Southern Manitoba Alternate Corridor Evaluation Model, developed during the stakeholder workshops, is provided in Table 8.5-2.

Table 8.5-2: Engineering Environment Layers and Weights (Model Values)

Engineering		
Linear Infrastructure	**35.7%**	***Areas of Least Preference***
Unutilized ROW (Manitoba Hydro Owned)	1	**Non-Spannable Waterbodies (300 m)**
Parallel Roads ROW	2.6	**Mines and Quarries (Active)**
Municipal Road Allowances	3.1	**Wastewater Treatment Areas**
Parallel Provincial Highways ROW	3.4	**Buildings**
Parallel Existing Transmission Lines	3.8	**Oil Well Heads (100m)**
No Linear Infrastructure	4.4	**Waste Disposal Sites**
Rebuild Existing Transmission & Sub-Transmission Line	5	**Towers and Antennae Area of Potential Affect (< 200m*)**
Parallel Oil / Gas Transmission Pipeline	5.6	**Existing Wind Turbine Area of Potential Affect (< 500m)**
Parallel Railway ROW	5.6	**Airports (Including Glide Paths - 2° Slope)**
Future MIT Plans	7.8	**Federal Park**
>= 300 kV Transmission Line & Within Separation Buffer	8.5	**Military Facilities**
Within Road, Railroad, or Utility ROW	9	
Spannable Waterbodies	**10.4%**	
No Waterbody	1	
Non-Nav. Spannable Waterbody (Standard Structures)	2.8	
Nav. Spannable Waterbody (Standard Structures)	4.3	
Non-Nav. Spannable Waterbody (Specialty Structures)	6	
Nav. Spannable Waterbody (Specialty Structures)	9	
Geotechnical Considerations	**30.2%**	
Rock	1	
No Special Geotechnical Considerations	1.3	
100 Year Floodplain	6.6	
Wetland / Peatlands	9	
Mining Operations / Quarries	**13.2%**	
No Mining Operation	1	
Abandoned / Inactive Mines (Aggregate Piles, Pits, etc)	6.5	
Mine-Owned Land	9	
Slope	**5.4%**	
Slope 0 - 15%	1	
Slope 15 - 30%	3.1	
Slope > 30%	9	
Proximity to Future Wind Farms	**5.1%**	
500m - 10k	1	
Within Future Wind Farm	5	
> 10k	9	

The adjusted Engineering Environment sub-model are summarized in Table 8.5-3. Items in gray are not present in the study area, or no suitable data source was identified to represent their locations.

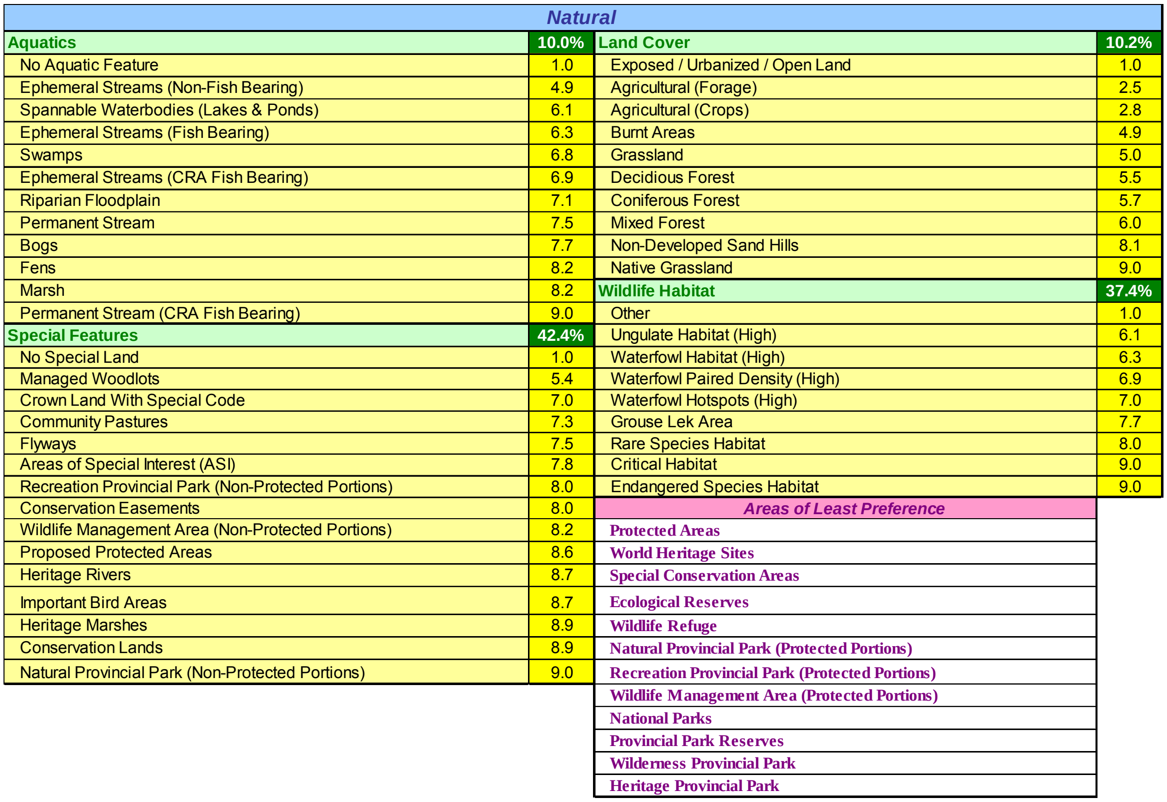
Table 8.5-3: Engineering Environment Adjusted Layers and Weights

Engineering		
Linear Infrastructure	**37.7%**	***Areas of Least Preference***
Unutilized ROW (Manitoba Hydro Owned)	1	**Non-Spannable Waterbodies**
Parallel Roads ROW	2.6	**Mines and Quarries (Active)**
Municipal Road Allowances	3.1	**Wastewater Treatment Areas**
Parallel Provincial Highways ROW	3.4	**Buildings**
Parallel Existing Transmission Lines	3.8	**Oil Well Heads (100m)**
No Linear Infrastructure	4.4	**Waste Disposal Sites**
Rebuild Existing Transmission & Sub-Transmission Line	-	**Towers and Antennae Area of Potential Affect (< 200m*)**
Parallel Oil / Gas Transmission Pipeline	5.6	**Existing Wind Turbine Area of Potential Affect (< 500m)**
Parallel Railway ROW	5.6	**Airports (Including Glide Paths - 2° Slope)**
Future MIT Plans	-	**Federal Park**
>= 300 kV Transmission Line & Within Separation Buffer	-	**Military Facilities**
Within Road, Railroad, or Utility ROW	9	
Spannable Waterbodies	**11.0%**	
No Waterbody	1	
Non-Nav. Spannable Waterbody (Standard Structures)	-	
Nav. Spannable Waterbody (Standard Structures)	4.3	
Non-Nav. Spannable Waterbody (Specialty Structures)	-	
Nav. Spannable Waterbody (Specialty Structures)	9	
Geotechnical Considerations	**31.9%**	
Rock	-	
No Special Geotechnical Considerations	1	
100 Year Floodplain	6.5	
Wetland / Peatlands	9	
Mining Operations / Quarries	**14.0%**	
No Mining Operation	1	
Abandoned / Inactive Mines (Aggregate Piles, Pits, etc)	6.5	
Mine-Owned Land	9	
Slope	**0.0%**	
Slope 0 - 15%	-	
Slope 15 - 30%	-	
Slope > 30%	-	
Proximity to Future Wind Farms	**5.4%**	
Adjacent - 10k	1	
Within Future Wind Farm	5	
> 10k	9	

8.5.2.2 Natural Environment

The Natural Environment sub-model of the Southern Manitoba Alternate Corridor Evaluation Model is provided in Table 8.5-4.

Table 8.5-4: Natural Environment Layers and Weights (Model Values)



Natural			
Aquatics	**10.0%**	**Land Cover**	**10.2%**
No Aquatic Feature	1.0	Exposed / Urbanized / Open Land	1.0
Ephemeral Streams (Non-Fish Bearing)	4.9	Agricultural (Forage)	2.5
Spannable Waterbodies (Lakes & Ponds)	6.1	Agricultural (Crops)	2.8
Ephemeral Streams (Fish Bearing)	6.3	Burnt Areas	4.9
Swamps	6.8	Grassland	5.0
Ephemeral Streams (CRA Fish Bearing)	6.9	Decidious Forest	5.5
Riparian Floodplain	7.1	Coniferous Forest	5.7
Permanent Stream	7.5	Mixed Forest	6.0
Bogs	7.7	Non-Developed Sand Hills	8.1
Fens	8.2	Native Grassland	9.0
Marsh	8.2	**Wildlife Habitat**	**37.4%**
Permanent Stream (CRA Fish Bearing)	9.0	Other	1.0
Special Features	**42.4%**	Ungulate Habitat (High)	6.1
No Special Land	1.0	Waterfowl Habitat (High)	6.3
Managed Woodlots	5.4	Waterfowl Paired Density (High)	6.9
Crown Land With Special Code	7.0	Waterfowl Hotspots (High)	7.0
Community Pastures	7.3	Grouse Lek Area	7.7
Flyways	7.5	Rare Species Habitat	8.0
Areas of Special Interest (ASI)	7.8	Critical Habitat	9.0
Recreation Provincial Park (Non-Protected Portions)	8.0	Endangered Species Habitat	9.0
Conservation Easements	8.0	***Areas of Least Preference***	
Wildlife Management Area (Non-Protected Portions)	8.2	**Protected Areas**	
Proposed Protected Areas	8.6	**World Heritage Sites**	
Heritage Rivers	8.7	**Special Conservation Areas**	
Important Bird Areas	8.7	**Ecological Reserves**	
Heritage Marshes	8.9	**Wildlife Refuge**	
Conservation Lands	8.9	**Natural Provincial Park (Protected Portions)**	
Natural Provincial Park (Non-Protected Portions)	9.0	**Recreation Provincial Park (Protected Portions)**	
		Wildlife Management Area (Protected Portions)	
		National Parks	
		Provincial Park Reserves	
		Wilderness Provincial Park	
		Heritage Provincial Park	

The adjusted Natural Environment sub-model are summarized in Table 8.5-5. Items in gray were not present in the study area, or no suitable data source could be identified to represent their locations.

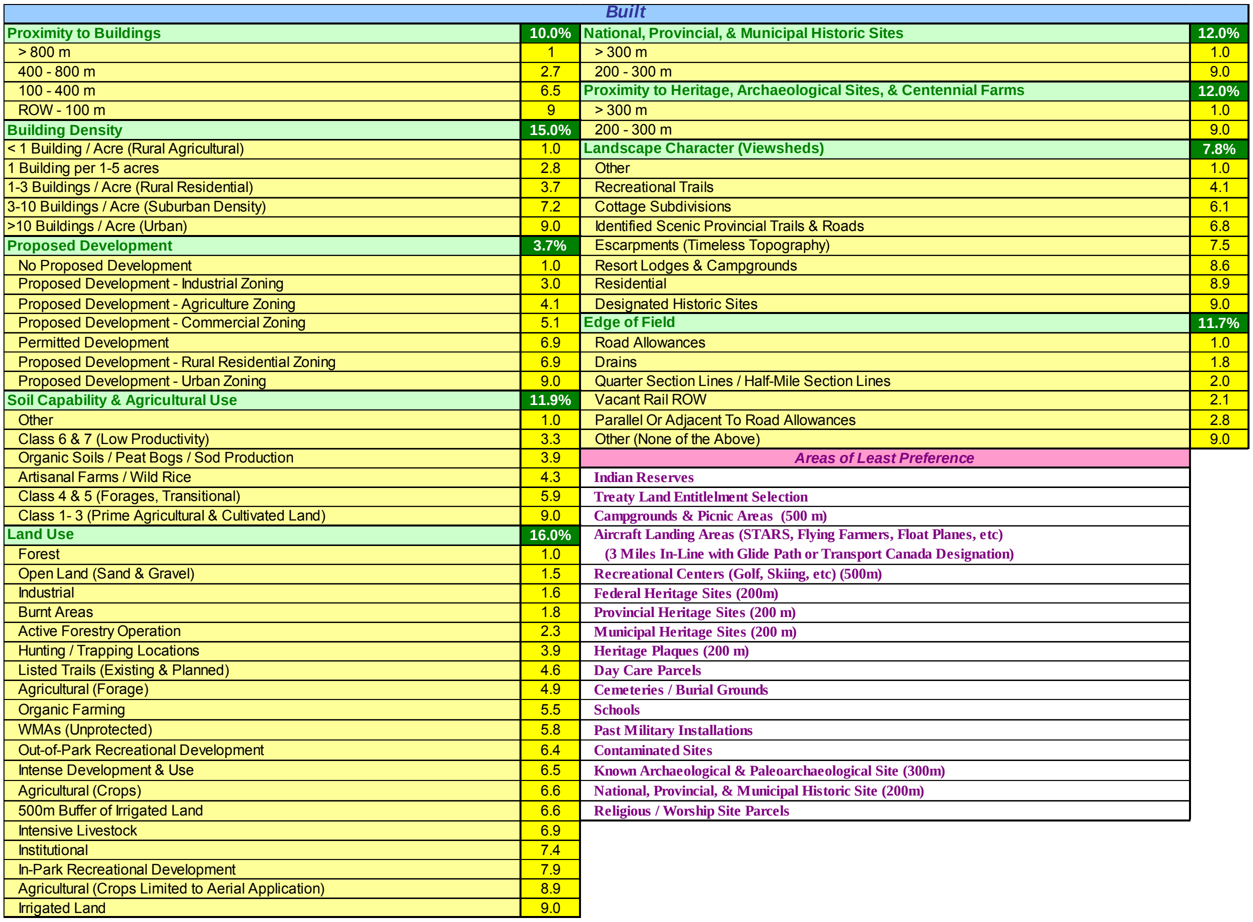
Table 8.5-5: Natural Environment Adjusted Data Layers and Weights

Natural			
Aquatics	**10.0%**	**Land Cover**	**10.2%**
No Aquatic Feature	1.0	Exposed / Urbanized / Open Land	1.0
Ephemeral Streams (Non-Fish Bearing)	-	Agricultural (Forage)	2.5
Spannable Waterbodies (Lakes & Ponds)	6.1	Agricultural (Crops)	2.8
Ephemeral Streams (Fish Bearing)	-	Burnt Areas	4.9
Swamps	6.8	Grassland	5.0
Ephemeral Streams (CRA Fish Bearing)	-	Decidious Forest	5.5
Riparian Floodplain	-	Coniferous Forest	5.7
Permanent Stream	7.5	Mixed Forest	-
Bogs	-	Non-Developed Sand Hills	-
Fens	8.2	Native Grassland	9.0
Marsh	8.2	**Wildlife Habitat**	**37.4%**
Permanent Stream (CRA Fish Bearing)	9.0	Other	1.0
Special Features	**42.4%**	Ungulate Habitat (High)	-
No Special Land	1.0	Waterfowl Habitat (High)	6.3
Managed Woodlots	5.5	Waterfowl Paired Density (High)	-
Crown Land With Special Code	-	Waterfowl Hotspots (High)	-
Community Pastures	7.4	Grouse Lek Area	-
Flyways	-	Rare Species Habitat	-
Areas of Special Interest (ASI)	7.9	Critical Habitat	9.0
Recreation Provincial Park (Non-Protected Portions)	8.1	Endangered Species Habitat	9.0
Conservation Easements	-	***Areas of Least Preference***	
Wildlife Management Area (Non-Protected Portions)	-	**Protected Areas**	
Proposed Protected Areas	8.7	**World Heritage Sites**	
Heritage Rivers	8.8	**Special Conservation Areas**	
Important Bird Areas	-	**Ecological Reserves**	
Heritage Marshes	9.0	**Wildlife Refuge**	
Conservation Lands	9.0	**Natural Provincial Park (Protected Portions)**	
Natural Provincial Park (Non-Protected Portions)	-	**Recreation Provincial Park (Protected Portions)**	
		Wildlife Management Area (Protected Portions)	
		National Parks	
		Provincial Park Reserves	
		Wilderness Provincial Park	
		Heritage Provincial Park	

8.5.2.3 Built Environment

The Built Environment sub-model of the Alternate Corridor Evaluation Model is provided in Table 8.5-6.

Table 8.5-6: Built Environment Layers and Weights (Model Values)



Built

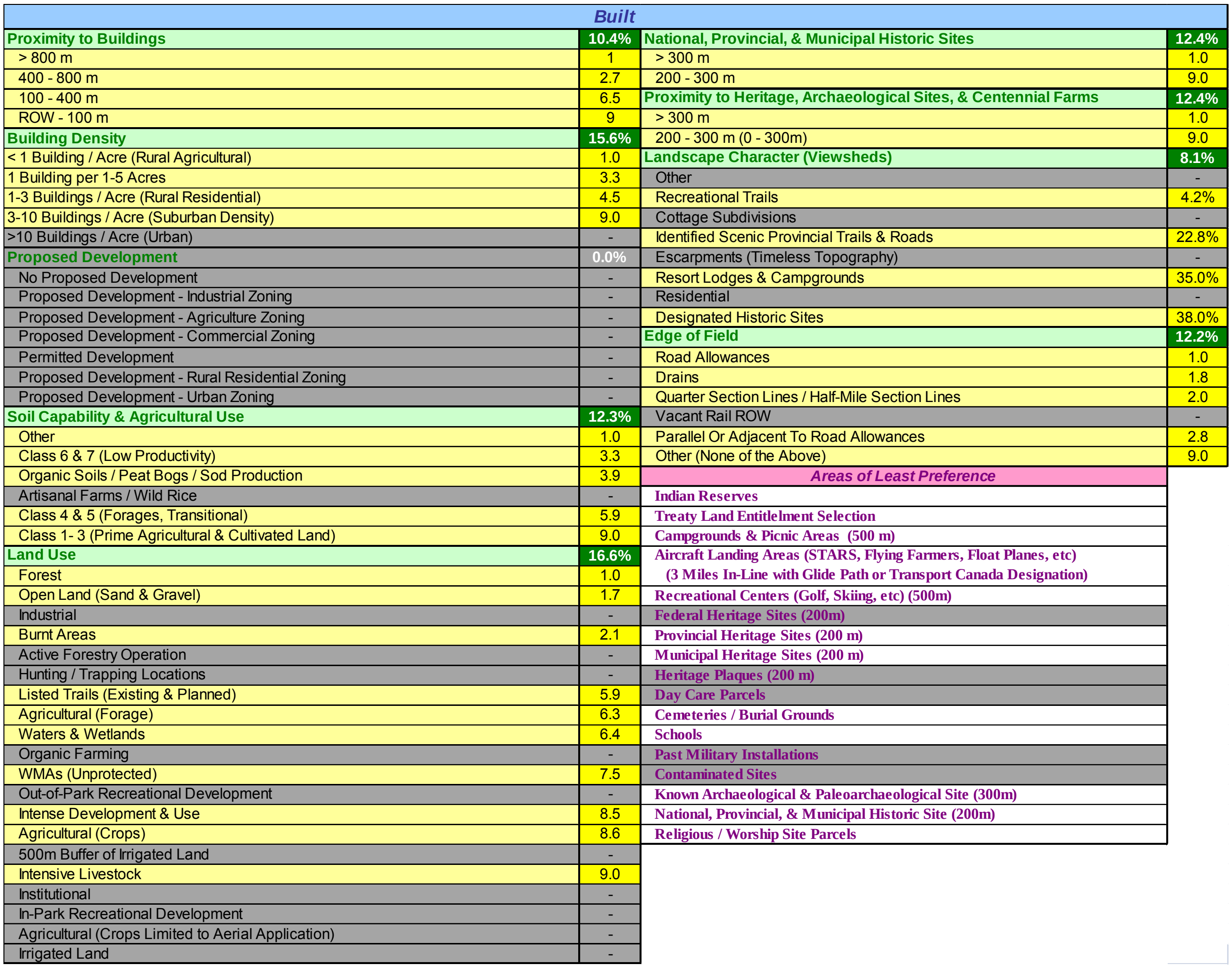
Proximity to Buildings	**10.0%**
> 800 m	1
400 - 800 m	2.7
100 - 400 m	6.5
ROW - 100 m	9
Building Density	**15.0%**
< 1 Building / Acre (Rural Agricultural)	1.0
1 Building per 1-5 acres	2.8
1-3 Buildings / Acre (Rural Residential)	3.7
3-10 Buildings / Acre (Suburban Density)	7.2
>10 Buildings / Acre (Urban)	9.0
Proposed Development	**3.7%**
No Proposed Development	1.0
Proposed Development - Industrial Zoning	3.0
Proposed Development - Agriculture Zoning	4.1
Proposed Development - Commercial Zoning	5.1
Permitted Development	6.9
Proposed Development - Rural Residential Zoning	6.9
Proposed Development - Urban Zoning	9.0
Soil Capability & Agricultural Use	**11.9%**
Other	1.0
Class 6 & 7 (Low Productivity)	3.3
Organic Soils / Peat Bogs / Sod Production	3.9
Artisanal Farms / Wild Rice	4.3
Class 4 & 5 (Forages, Transitional)	5.9
Class 1- 3 (Prime Agricultural & Cultivated Land)	9.0
Land Use	**16.0%**
Forest	1.0
Open Land (Sand & Gravel)	1.5
Industrial	1.6
Burnt Areas	1.8
Active Forestry Operation	2.3
Hunting / Trapping Locations	3.9
Listed Trails (Existing & Planned)	4.6
Agricultural (Forage)	4.9
Organic Farming	5.5
WMAs (Unprotected)	5.8
Out-of-Park Recreational Development	6.4
Intense Development & Use	6.5
Agricultural (Crops)	6.6
500m Buffer of Irrigated Land	6.6
Intensive Livestock	6.9
Institutional	7.4
In-Park Recreational Development	7.9
Agricultural (Crops Limited to Aerial Application)	8.9
Irrigated Land	9.0

National, Provincial, & Municipal Historic Sites	**12.0%**
> 300 m	1.0
200 - 300 m	9.0
Proximity to Heritage, Archaeological Sites, & Centennial Farms	**12.0%**
> 300 m	1.0
200 - 300 m	9.0
Landscape Character (Viewsheds)	**7.8%**
Other	1.0
Recreational Trails	4.1
Cottage Subdivisions	6.1
Identified Scenic Provincial Trails & Roads	6.8
Escarpments (Timeless Topography)	7.5
Resort Lodges & Campgrounds	8.6
Residential	8.9
Designated Historic Sites	9.0
Edge of Field	**11.7%**
Road Allowances	1.0
Drains	1.8
Quarter Section Lines / Half-Mile Section Lines	2.0
Vacant Rail ROW	2.1
Parallel Or Adjacent To Road Allowances	2.8
Other (None of the Above)	9.0

Areas of Least Preference
Indian Reserves
Treaty Land Entitlelment Selection
Campgrounds & Picnic Areas (500 m)
Aircraft Landing Areas (STARS, Flying Farmers, Float Planes, etc) **(3 Miles In-Line with Glide Path or Transport Canada Designation)**
Recreational Centers (Golf, Skiing, etc) (500m)
Federal Heritage Sites (200m)
Provincial Heritage Sites (200 m)
Municipal Heritage Sites (200 m)
Heritage Plaques (200 m)
Day Care Parcels
Cemeteries / Burial Grounds
Schools
Past Military Installations
Contaminated Sites
Known Archaeological & Paleoarchaeological Site (300m)
National, Provincial, & Municipal Historic Site (200m)
Religious / Worship Site Parcels

The adjusted Built Environment data layers and their relative weights for the St Vital to Letellier project are summarized in Table 8.5-7. Items highlighted in grey were not present in the study area or no suitable data source could be identified to represent their locations.

Table 8.5-7: Built Environment Adjusted Data Layers and Weights



Built			
Proximity to Buildings	**10.4%**	**National, Provincial, & Municipal Historic Sites**	**12.4%**
> 800 m	1	> 300 m	1.0
400 - 800 m	2.7	200 - 300 m	9.0
100 - 400 m	6.5	**Proximity to Heritage, Archaeological Sites, & Centennial Farms**	**12.4%**
ROW - 100 m	9	> 300 m	1.0
Building Density	**15.6%**	200 - 300 m (0 - 300m)	9.0
< 1 Building / Acre (Rural Agricultural)	1.0	**Landscape Character (Viewsheds)**	**8.1%**
1 Building per 1-5 Acres	3.3	Other	-
1-3 Buildings / Acre (Rural Residential)	4.5	Recreational Trails	4.2%
3-10 Buildings / Acre (Suburban Density)	9.0	Cottage Subdivisions	-
>10 Buildings / Acre (Urban)	-	Identified Scenic Provincial Trails & Roads	22.8%
Proposed Development	**0.0%**	Escarpments (Timeless Topography)	-
No Proposed Development	-	Resort Lodges & Campgrounds	35.0%
Proposed Development - Industrial Zoning	-	Residential	-
Proposed Development - Agriculture Zoning	-	Designated Historic Sites	38.0%
Proposed Development - Commercial Zoning	-	**Edge of Field**	**12.2%**
Permitted Development	-	Road Allowances	1.0
Proposed Development - Rural Residential Zoning	-	Drains	1.8
Proposed Development - Urban Zoning	-	Quarter Section Lines / Half-Mile Section Lines	2.0
Soil Capability & Agricultural Use	**12.3%**	Vacant Rail ROW	-
Other	1.0	Parallel Or Adjacent To Road Allowances	2.8
Class 6 & 7 (Low Productivity)	3.3	Other (None of the Above)	9.0
Organic Soils / Peat Bogs / Sod Production	3.9	***Areas of Least Preference***	
Artisanal Farms / Wild Rice	-	**Indian Reserves**	
Class 4 & 5 (Forages, Transitional)	5.9	**Treaty Land Entitlement Selection**	
Class 1- 3 (Prime Agricultural & Cultivated Land)	9.0	**Campgrounds & Picnic Areas (500 m)**	
Land Use	**16.6%**	**Aircraft Landing Areas (STARS, Flying Farmers, Float Planes, etc) (3 Miles In-Line with Glide Path or Transport Canada Designation)**	
Forest	1.0		
Open Land (Sand & Gravel)	1.7	**Recreational Centers (Golf, Skiing, etc) (500m)**	
Industrial	-	**Federal Heritage Sites (200m)**	
Burnt Areas	2.1	**Provincial Heritage Sites (200 m)**	
Active Forestry Operation	-	**Municipal Heritage Sites (200 m)**	
Hunting / Trapping Locations	-	**Heritage Plaques (200 m)**	
Listed Trails (Existing & Planned)	5.9	**Day Care Parcels**	
Agricultural (Forage)	6.3	**Cemeteries / Burial Grounds**	
Waters & Wetlands	6.4	**Schools**	
Organic Farming	-	**Past Military Installations**	
WMAs (Unprotected)	7.5	**Contaminated Sites**	
Out-of-Park Recreational Development	-	**Known Archaeological & Paleoarchaeological Site (300m)**	
Intense Development & Use	8.5	**National, Provincial, & Municipal Historic Site (200m)**	
Agricultural (Crops)	8.6	**Religious / Worship Site Parcels**	
500m Buffer of Irrigated Land	-		
Intensive Livestock	9.0		
Institutional	-		
In-Park Recreational Development	-		
Agricultural (Crops Limited to Aerial Application)	-		
Irrigated Land	-		

8.5.3 Suitability Surfaces

Suitability Surfaces were created by combining the three perspectives (Engineering Environment, Natural Environment, and Built Environment) described in the preceding sections. Each Suitability Surface represents a weighted combination of the three perspectives. Four scenarios were created by distributing the weight of each environment. The Suitability Surfaces are used in performing the “optimal path” analysis. The algorithm is applied to each surface to develop the four Alternate Corridors.

Engineering Environment Surface (Map 8-1): The data layers from the Engineering Environment Perspective are given five times (72%) the emphasis of the Built Environment (14%) and Natural Environment (14%) perspectives.

Natural Environment Surface (Map 8-2): The data layers from the Natural Environment Perspective are given five times (72%) the emphasis of the Built Environment (14%) and Engineering Environment (14%) perspectives.

Built Environment Surface (Map 8-3): The data layers from the Built Environment Perspective are given five times (72%) the emphasis of the Natural Environment (14%) and Engineering Environment (14%) perspectives.

Simple Average Surface (Map 8-4): The data layers for the Simple Average suitability surface are given equal emphasis (33.3% applied to all three Perspectives).

8.5.4 Alternate Corridors

Each Suitability Surface was used in the next phase of the analysis. This phase is called Alternate Corridor Analysis, and involves the creation of "least cost paths." An algorithm is used to find the cost of every possible path (route) between the two end points. A path is any continuous string of grid cells, 5 x 5 meters in size, connecting the existing St Vital substation site to the area near Grunthal, and then again from the Grunthal area to the Letellier substation site.

The "cost" is the accrual of suitability values of those grid cells. Lower summed values indicate relatively suitable paths, whereas higher summed values indicate relatively less suitable paths.

When the Alternate Route Analysis was performed on the Engineering Environment Weighted Suitability Surface, the result was the Engineering Alternate Corridors (Map 8-5).

8.5.4.1 Natural Environment Alternate Corridor

When the Alternate Route Analysis was performed on the Natural Environment Weighted Suitability Surface, the result was the Natural Environment Alternate Corridor (Map 8-6).

8.5.4.2 Built Environment Alternate Corridor

When the Alternate Route Analysis was performed on the Built Environment Weighted Suitability Surface, the result was the Built Environment Alternate Corridor (Map 8-7).

8.5.4.3 Simple Average Alternate Corridor

When the Alternate Route Analysis was performed on the Simple Average Suitability Surface, the result was the Simple Average Alternate Corridor (Map 8-8).

8.5.5 Composite Corridor and Comparison of Alternate Corridors

The Composite Corridor is simply the combination of the four Alternate Corridors. Map 8-9 shows the Composite Corridors for St Vital to Grunthal and Grunthal to Letellier.

The area represented by the Composite Corridor serves as the base for the next phase of data collection. The Project Study Area was examined almost exclusively by aerial photography and existing data. Subsequently, the features in the composite corridor were verified by the project team in the field. This level of verification provides the project team with the most accurate data needed to develop alternate routes.

8.6 ALTERNATE ROUTES

Internal Manitoba Hydro project team members reviewed the Alternate Corridors and developed possible centerline routes within the composite corridor. The centerline routes are referred to as Alternate Routes. Alternate Routes are comprised of Alternate Route Segments. A segment is any portion of the line between two route intersections. The segments were presented in Round 1 of the public engagement process (Map 8-10). The public were allowed to provide input and suggest new route alternatives. After studying the Alternate Corridors and including input from the public engagement program (Chapter 7), there were 85 Alternate Route Segments.

8.6.1 Alternate Route Evaluation

Considering the network created by the arrangement of Alternate Route segments, analysis was performed to determine all reasonable combinations of segments resulting in routes that connected the endpoints of the project. These are referred to as Alternate Routes. There were 20 Alternate Routes between St Vital and Grunthal and 7623 Alternate Routes between Grunthal and Letellier.

8.6.1.1 Alternate Route Analysis

The next phase of the EPRI-GTC Methodology is called Alternate Route Analysis. Typically, multiple Alternate Routes are compared to one another using route statistics. The routes are ranked based on criteria, with the purpose of determining the top routes based on the statistical data. This task is accomplished by the use of the Alternate Route Evaluation Model (Table 8.6-1). In this model, metrics are assigned to each of the 85 Alternate Route Segments. The metrics are determined by criteria that were defined by Manitoba Hydro team members during the Alternate Route Evaluation Model calibration meeting. The criteria are grouped into Engineering, Natural, and Built perspectives and each criterion is given a weight.

After the data is gathered, the model is adjusted as data for some of the criteria is not available, or does not exist, for the study area. If the data does not exist, or no features are present, the weight for that criteria is redistributed to the other criteria. The adjusted model is shown in Table 8.6-1.

The statistics for all the component segments were summed, resulting in statistics for each of the overall routes.

Table 8.6-1: Alternate Route Evaluation Model

Feature	Weight	
	Original	**Adjusted**
Built		
Relocated Residences - Within ROW	35.3%	43.4%
Potential Relocated Residences (75m) - Edge of ROW	19.1%	23.5%
Proximity to Residences (75 - 250m) - Edge of ROW	6.4%	7.9%
Proposed Developments - Within ROW	1.1%	0.0%
Agriculture Crop Land (Acres) - ROW	2.6%	3.2%
Irrigated Land (Acres) - ROW	6.5%	0.0%
Shelter Belts (Acres) - ROW	2.5%	3.1%
Diagonal Crossings of Agriculture Crop Land (Km)	6.7%	8.3%
Proximity to Commercial Buildings (100m) - Edge of ROW	1.3%	1.6%
Proximity to Industrial Buildings (100m) - Edge of ROW	1.1%	0.0%
Special Features (Schools, Churches, etc.) (250m) - Edge of ROW	10.1%	0.0%
Historic / Cultural Resources (250m) - Edge of ROW	7.3%	9.0%
TOTAL	*100.0%*	*100.0%*
Natural		
Natural Forests (Acres) - ROW	4.4%	6.1%
Stream/River Crossings - Centerline	1.7%	2.3%
Wetland Areas (Acres) - ROW	11.2%	15.4%
High Quality Wildlife Habitat (Acres) - ROW	15.6%	21.5%
Floodplain/Riparian Areas (Acres) - ROW	8.0%	11.0%
Special Areas (ASI, Proposed Protected Areas, etc.)	27.5%	0.0%
Native Grassland Areas (Acres) - ROW	31.7%	43.7%
TOTAL	*100.1%*	*100.0%*
Engineering		
% Parallel Existing T/L	8.2%	21.4%
% Parallel Roads	8.2%	21.4%
% Rebuild Existing T/L (Reconductor, Double Circuit, etc)	24.6%	0.0%
Length in Separation Buffer (Km)	37.1%	0.0%
Existing Transmission Line Crossings (#)	3.8%	9.9%

Table 8.6-1: Alternate Route Evaluation Model

Feature	Weight	
	Original	**Adjusted**
Accessibility	15.2%	39.7%
Total Project Costs	2.9%	7.6%
TOTAL	*100.0%*	*100.0%*

8.6.2 Raw and Normalized Statistics

The next step of the analysis is to normalize the raw statistics. The statistics are normalized (that is, distributed along a scale from zero to one) to allow comparison between each of the layers. The layers comprise disparate data types (counts, acreages, lengths, monetary values, etc). Without normalizing the values, it would be difficult to compare the statistics among routes. Routes with a normalized value closer to zero represent more suitable routes, while routes with a value closer to one represent less suitable routes. The values associated with co-location opportunities were inverted since a higher value in this category is seen as desirable, not as a detriment.

8.6.3 Expert Judgment

In the Expert Judgment phase of analysis, the number of Alternate Routes is reduced to finalists. This process is facilitated through discussion and examination of the statistical results of the Alternate Route Evaluation Model. It is important to note that the top scoring routes do not necessarily constitute the best routes with respect to all considerations. The Expert Judgment step allows for the incorporation of considerations such as feedback received in the engagement program to be considered by experienced professionals, together with route statistics, to provide input to the final selection of the preferred route.

Once the top routes, from the Alternate Route Evaluation, are selected from the route statistics in the alternate route evaluation model, the project team identifies considerations that should be applied to the selection of the preferred route. Each consideration is given a percentage of weight relative to its overall importance. These considerations are gathered from the team’s awareness of the project area, particularly its geographical and sociological makeup and input from the public engagement process (Chapter 7). The selected routes are discussed, reviewed, compared, and judged relative to one another. Each route receives a value between 1 and 3, for each of the criteria in the model, with lower values indicating higher suitability.

8.6.3.1 St Vital – Grunthal Expert Judgment

Using the Alternate Route Evaluation statistics (provided in Table 8.6-2 For the top four routes), the 20 Alternate Routes for the St Vital to Grunthal portion of the project were represented by a histogram (Figure 1-3). For each Alternate Route, the histogram depicts the overall scores from each perspective (Engineering, Natural, Built, and Simple Average). Using this histogram, it's possible to visually determine the top scoring routes. Lower values indicate relatively more suitable routes, and higher scores indicate relatively less suitable routes.

The project team reviewed the 20 Alternate Routes, titled Route A – Route T, in detail. Considering information obtained through public engagement, as well as statistical analysis (Table 8.6-2), Routes B, J, R and T were carried forward into Expert Judgment.

Table 8.6-2: Route Statistics for the Top Four Routes from St. Vital Station to Grunthal

Feature	Weight	Route B	Route J	Route R	Route T
Built					
Relocated Residences - Within ROW		2	1	1	2
Normalized Score		0.5	0	0	0.5
Weighted Score	44.2%	0.22	0	0	0.22
Potential Relocated Residences (75m) - Edge of ROW		88	87	91	88
Normalized Score		0.5	0.375	0.875	0.5
Weighted Score	23.9%	0.12	0.09	0.21	0.12
Proximity to Residences (75 - 250m) - Edge of ROW		191	191	198	200
Normalized Score		0.25	0.25	0.83	1.00
Weighted Score	8.0%	0.02	0.02	0.07	0.08
Agriculture Crop Land (Acres) - ROW		497.12	486.52	558.44	472.04
Normalized Score		0.52	0.43	1.00	0.32
Weighted Score	3.3%	0.02	0.01	0.03	0.01
Shelter Belts (Acres) - ROW		0.65	0.46	1.27	2.57
Normalized Score		0.05	0.00	0.21	0.55
Weighted Score	3.1%	0	0	0.01	0.02
Diagonal Crossings of Agriculture Crop Land (Km)		1.25	3.03	1.25	1.25
Normalized Score		0	1	0	0
Weighted Score	8.4%	0	0.08	0	0
Historic / Cultural Resources (250m) - Edge of ROW		0	0	0	0
Normalized Score		0	0	0	0
Weighted Score	9.1%	0	0	0	0
WEIGHTED TOTAL	**100.0%**	**0.38**	**0.21**	**0.32**	**0.45**
Natural					
Natural Forests (Acres) - ROW		17.52	15.84	12.85	13.30
Normalized Score		0.36	0.26	0.10	0.13
Weighted Score	10.8%	0.04	0.03	0.01	0.01
Stream/River Crossings - Centerline		22	21	26	24
Normalized Score		0.375	0.25	0.875	0.625
Weighted Score	4.2%	0.02	0.01	0.04	0.03
Wetland Areas (Acres) - ROW		0	0	0	0
Normalized Score		0	0	0	0
Weighted Score	27.4%	0	0	0	0
High Quality Wildlife Habitat (Acres) - ROW		19.29	17.60	16.04	16.49
Normalized Score		0.30	0.20	0.11	0.13
Weighted Score	38.0%	0.11	0.08	0.04	0.05
Floodplain/Riparian Areas (Acres) - ROW		164.13	164.13	81.99	81.99
Normalized Score		1	1	0	0
Weighted Score	19.6%	0.196	0.196	0	0
WEIGHTED TOTAL	**100.0%**	**0.36**	**0.31**	**0.09**	**0.09**
Engineering					
% Parallel Existing T/L		0.11	0.10	0.16	0.18
Normalized Score		0.11	0.09	0.81	1.00
Inverted		0.89	0.91	0.19	0.00
Weighted Score	21.4%	0.19	0.19	0.04	0
% Parallel Roads		0.30	0.29	0.36	0.36
Normalized Score		0.79	0.77	0.98	1.00
Inverted		0.21	0.23	0.02	0.00
Weighted Score	21.4%	0.04	0.05	0	0
Existing Transmission Line Crossings (#)		5	5	7	7
Normalized Score		0	0	1	1
Weighted Score	9.9%	0	0	0.1	0.1
Accessibility		27069988	29183095	35026553	33559543

Table 8.6-2: Route Statistics for the Top Four Routes from St. Vital Station to Grunthal

Feature	Weight	Route B	Route J	Route R	Route T
Normalized Score		0.00	0.11	0.42	0.35
Weighted Score	39.7%	0	0.04	0.17	0.14
Total Project Costs		$ 28,552,550	$29,445,400	$34,744,350	$31,163,450
Normalized Score		0.14	0.27	1.00	0.50
Weighted Score	7.6%	0.01	0.02	0.08	0.04
WEIGHTED TOTAL	**100.0%**	**0.24**	**0.31**	**0.39**	**0.27**
SUM OF WEIGHTED TOTALS*		**0.98**	**0.83**	**0.80**	**0.81**

* The lower the number, the more suitable for routing a transmission line

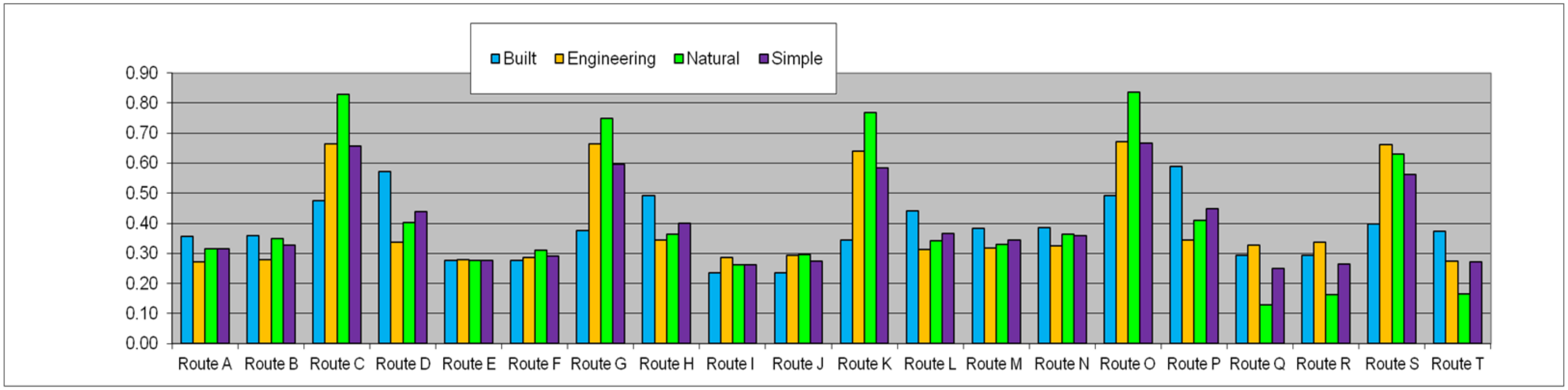


Figure 8.6-1: Combined Ranking for Alternative Routes

8.6.3.2 Grunthal - Letellier

Statistics were prepared in the same manner for the 7,623 Alternate Routes for the southern half of the St Vital to Letellier project. However, the large number of Alternate Routes makes the use of the histogram impractical. Using the statistical analysis and rankings, the project team went through a series of steps in order to reduce the 7,623 routes to a manageable number.

First, the team decided to remove from consideration all routes that scored in the bottom 50% of the rankings with respect to at least one perspective. This reduced the number of routes to 1,061.

Next, the team removed all routes that had backtracking. "Backtracking" was defined as a location of a route where the path bent back on itself within a relatively close proximity. An example would be a route that traveled south along a ½ mile road, then turned east and traveled to a mile road and then turned north. Here, the route would backtrack on itself. Routes with backtracking portions were examined by the project team. If the backtracking did not provide value to the overall route, the route was eliminated. This reduced the number of routes to 1,026.

The next group of routes that were removed from consideration came from a series of matchups. "Matchups" were defined as two or more Alternate Routes that traveled in the same direction through a relatively small area. For example, one set of Alternate Routes may travel along a mile road, while a second set travels parallel to the first set along the adjacent mile road. In these matchup comparisons, the statistics, rankings, and relative suitability values for each set of routes were examined by the project team. Along with the statistical review, expert opinion and public input were used to select one set of routes over the other. Routes not selected were then removed from consideration. Using these matchups, the number of routes was reduced to 375.

From 375 potential routes, the team examined the top scoring routes (shown in Table 8.6-3) from those still in consideration. The top routes from the Built perspective (Routes GZG and Route HFC), the third best route from the Engineering perspective (Route BWJ) and the top route from both the Natural and Engineering Perspectives (Route BWJ in both instances) were all selected to move on to Expert Judgment. Route BWE was included to provide an alternative route around an aerial applicator in the area of BWJ. Before final consideration, however, the team elected to omit route GZG as it was nearly identical to Route HFC. Route HFC provided a better Engineering score and eliminated two high-angle structures, as well as reduced the overall length of the potential route. Routes, BWE, BWJ, and HFC, were carried forward into Expert Judgment.

Table 8.6-3: Route Statistics for the Top Three Routes from Grunthal to Letellier

Feature	Weight	Route BWE	Route BWJ	Route HFC
Built				
Relocated Residences - Within ROW		0	0	0
Normalized Score		0	0	0
Weighted Score	43.4%	0.00	0.00	0.00
Potential Relocated Residences (75m) - Edge of ROW		8	6	5
Normalized Score		0.26	0.17	0.13
Weighted Score	23.5%	0.06	0.04	0.03
Proximity to Residences (75 - 250m) - Edge of ROW		17	15	15
Normalized Score		0.27	0.24	0.24
Weighted Score	7.9%	0.02	0.02	0.02
Agriculture Crop Land (Acres) - ROW		515.42	495.63	460.47
Normalized Score		0.29	0.24	0.16
Weighted Score	3.2%	0.01	0.01	0.01
Shelter Belts (Acres) - ROW		2.57	1.51	0.06
Normalized Score		0.53	0.31	0.01
Weighted Score	3.1%	0.02	0.01	0.00
Diagonal Crossings of Agriculture Crop Land (Km)		5.86	5.86	0.28
Normalized Score		0.54	0.54	0.03
Weighted Score	8.3%	0.04	0.04	0.00
Proximity to Commercial Buildings (100 m) edge of ROW		0	0	0
Normalized Score		0	0	0

Table 8.6-3: Route Statistics for the Top Three Routes from Grunthal to Letellier

Feature	Weight	Route BWE	Route BWJ	Route HFC
Weighted Score	1.6%	0.00	0.00	0.00
Historic / Cultural Resources (250m) - Edge of ROW		0	0	0
Normalized Score		0	0	0
Weighted Score	9.0%	0.00	0.00	0.00
WEIGHTED TOTAL	**100.0%**	**0.15**	**0.12**	**0.06**
Natural				
Natural Forests (Acres) - ROW		35.30	33.25	36.39
Normalized Score		0.15	0.10	0.17
Weighted Score	6.1%	0.01	0.01	0.01
Stream/River Crossings - Centerline		20	22	26
Normalized Score		0.12	0.18	0.30
Weighted Score	2.3%	0.00	0.00	0.01
Wetland Areas (Acres) - ROW		0.25	0.00	0.00
Normalized Score		0.10	0.00	0.00
Weighted Score	15.4%	0.02	0.00	0.00
High Quality Wildlife Habitat (Acres) - ROW		37.83	35.53	42.95
Normalized Score		0.11	0.07	0.22
Weighted Score	21.5%	0.02	0.01	0.05
Floodplain/Riparian Areas (Acres) - ROW		369.93	311.90	179.20
Normalized Score		0.59	0.41	0.01
Weighted Score	11.0%	0.07	0.05	0.00
Native Grassland (Acres) - ROW		0.00	0.00	0.00
Normalized Score		0.00	0.00	0.00

Table 8.6-3: Route Statistics for the Top Three Routes from Grunthal to Letellier

Feature	**Weight**	**Route BWE**	**Route BWJ**	**Route HFC**
Weighted Score	43.7%	0.00	0.00	0.00
WEIGHTED TOTAL	**100.0%**	**0.12**	**0.07**	**0.07**
Engineering				
% Parallel Existing T/L		0.12	0.12	0.00
Normalized Score		0.64	0.64	0.00
Inverted		0.36	0.36	1.00
Weighted Score	21.4%	0.08	0.08	0.21
% Parallel Roads		0.82	0.81	0.77
Normalized Score		0.86	0.86	0.77
Inverted		0.14	0.14	0.23
Weighted Score	21.4%	0.03	0.03	0.05
Existing Transmission Line Crossings (#)		2	2	3
Normalized Score		0.67	0.67	1.00
Weighted Score	9.9%	0.07	0.07	0.10
Accessibility		17,756,871	17,377,172	19,142,168
Normalized Score		0.23	0.22	0.27
Weighted Score	39.7%	0.09	0.09	0.11
Total Project Costs		$34,482,750	$34,448,800	$36,061,300
Normalized Score		0.06	0.06	0.15
Weighted Score	7.6%	0.00	0.00	0.01
WEIGHTED TOTAL	**100.0%**	**0.27**	**0.27**	**0.48**
SUM OF WEIGHTED TOTALS*		**0.54**	**0.46**	**0.60**

* The lower the number, the more suitable for routing a transmission line

8.6.4 Expert Judgment Criteria

On September 18th, 2013, the MH project team met to discuss the criteria that would be used in Expert Judgment. In addition to identifying the Expert Judgment criteria, weights were also determined and represented as percentages for each criterion. The following criteria were selected and weighted as follows:

- **Cost - 40% (**Constructability, line length, angle towers etc.)
- **Community - 30%** (Input received from engagement program)
- **Schedule risks - 10% (**Approvals, regulatory permits, property acquisition, seasonality of construction)
- **Environmental Concerns - 15%** (impacts to natural areas)
- **System Reliability - 5% (**separation from similarly purposed lines, risk of common mode outage, etc.)

8.6.5 Expert Judgment Analysis

On October 10, 2013, the project team met to select the preferred route. The route finalists were discussed for each portion of the project, St Vital to Grunthal and Grunthal to Letellier. Using the Alternate Route Evaluation statistics, and with expert opinion from the project team members, values of 1-3 were assigned to each of the routes and the final route for each portion of the project were selected. Discussions were guided by the experts responsible for each criterion.

8.6.5.1 St Vital to Letellier

Routes B, J, R, and T were selected for Expert Judgment. The values assigned by the project team were input to the Expert Judgment Model. Table 8.6-4 provides the results of the Expert Judgment. When the weights for each criterion were considered, the result was the selection of Route B as the preferred route for the St Vital to Grunthal portion of the St Vital to Letellier project.

Table 8.6-4: Expert Judgment, St Vital to Grunthal (showing relative scores, weighted scores and total sum. Lower values are preferred for routing)

	Weight	Route B	Route J	Route R	Route T
Cost		2	3	4	1
Weighted	40%	0.8	1.20	1.60	0.40
Community		2	1	3	4
Weighted	30%	0.60	0.30	0.90	1.20
Risk to Schedule		1	1	2	2
Weighted	10%	0.10	0.10	0.20	0.20
Environmental Concerns		1	1	1	1
Weighted	15%	0.15	0.15	0.15	0.15
Reliability					
Weighted	5%	0.05	0.10	0.20	0.15
TOTAL		**1.70**	**1.85**	**3.05**	**2.10**

8.6.5.2 Grunthal to Letellier

Routes BWE, BWJ, and HFC were selected for Expert Judgment. The values assigned by the project team were then input to the Expert Judgment Model. Table 8.6-5 displays the results of the Expert Judgment. When the weights for each criterion were considered, the result was the selection of Route HFC as the preferred route for the St Vital to Grunthal portion of the project.

Table 8.6-5: Expert Judgment, Grunthal to Letellier (showing relative scores, weighted scores and total sum. Lower values are preferred for routing)

	Weight	Route BWE	Route BWJ	Route HFC
Cost		2	2	1
Weighted	40%	0.80	0.80	0.40
Community		2.5	2	1
Weighted	30%	0.75	0.60	0.30
Risk to Schedule		2	2	1
Weighted	10%	0.20	0.20	0.10
Environmental Concerns		1.5	1	2
Weighted	15%	0.23	0.15	0.30

Table 8.6-5: Expert Judgment, Grunthal to Letellier (showing relative scores, weighted scores and total sum. Lower values are preferred for routing)

	Weight	Route BWE	Route BWJ	Route HFC
Reliability		3	3	1
Weighted	5%	0.15	0.15	0.05
TOTAL		**2.13**	**1.90**	**1.15**

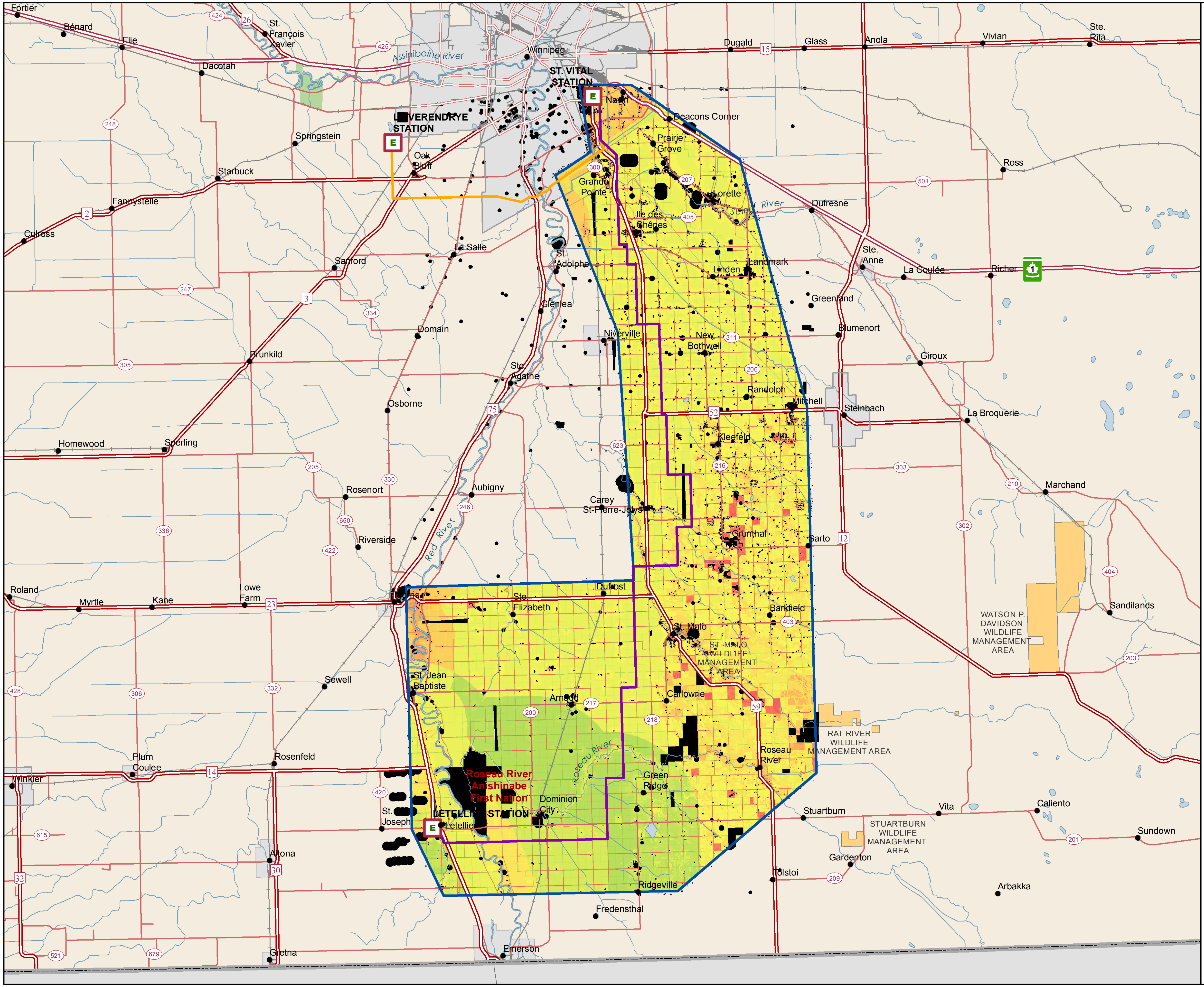
8.7 FINAL PREFERRED ROUTE

The route selection study was based on the EPRI-GTC Routing Methodology. The results of this study developed a route for a 230-kV transmission line right-of-way from the existing St. Vital substation to the existing Letellier substation. Through the successful execution of the standard project methodology, Routes B and HFC emerged as the most suitable and defensible route for the construction of the new transmission line. The preliminary preferred route (PPR) is shown in Map 8-11).

The preliminary preferred route was presented in Round 2 of the Public Engagement Process (details on the PEP are provided in Chapter 7). Based on feedback from this process and review of the preliminary preferred route, several route adjustments were considered as follows:

- Ritchot Disposal Site - the PPR passed directly over a recently expanded cell of the Ritchot Disposal Site. In discussions with the RM of Ritchot and the Manager of MidCanada Environmental Services (operators of the facility) it was decided that the PPR should be adjusted to avoid existing and future conflict with the facility.
- A landowner north of Iles Des Chenes requested that the route move in field, to increase the distance between the transmission line and two homes. Manitoba Hydro presented the proposed adjustment to the affected landowners. It was decided that the proposed adjustment would not be made as the changes would not minimize overall potential effects.
- A landowner southeast of Dominion City requested that the route be moved 1 mile (1.61 km) west to minimize impacts to agricultural use of the land. The adjustment was reviewed but not considered as the proposed adjustment moved the route onto an adjacent landowner and increased clearing of riparian vegetation along the Roseau River.
- An owner of an air strip, adjacent to the PPR requested that the route be moved away from the air strip. The proposed adjustment was reviewed and Manitoba Hydro determined that the route would be moved east to minimize potential impacts to the users of the air strip.

Map 8-12 shows the Final Preferred Route that is being proposed for the project. The assessment of potential effects (outlined in Chapter 9) was based on this route.



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- E Electrical Station
- Final Preferred Route (V95L)
- La Verendrye-St.Vital (Y36V) Transmission Line
- Project Siting Study Area

Suitability Surface

- ■ Areas of Least Preference

Engineering Considerations Emphasis

Less Suitable

More Suitable

Landbase

- ● Community
- 1 Trans Canada
- 20 Provincial Highway
- Provincial Road
- Railway
- City / Town
- First Nation
- Provincial Park
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN,
Photo Science/Quantum Spatial
Date Created: May 15, 2014

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0 5 10 Kilometres
0 2.5 5 Miles

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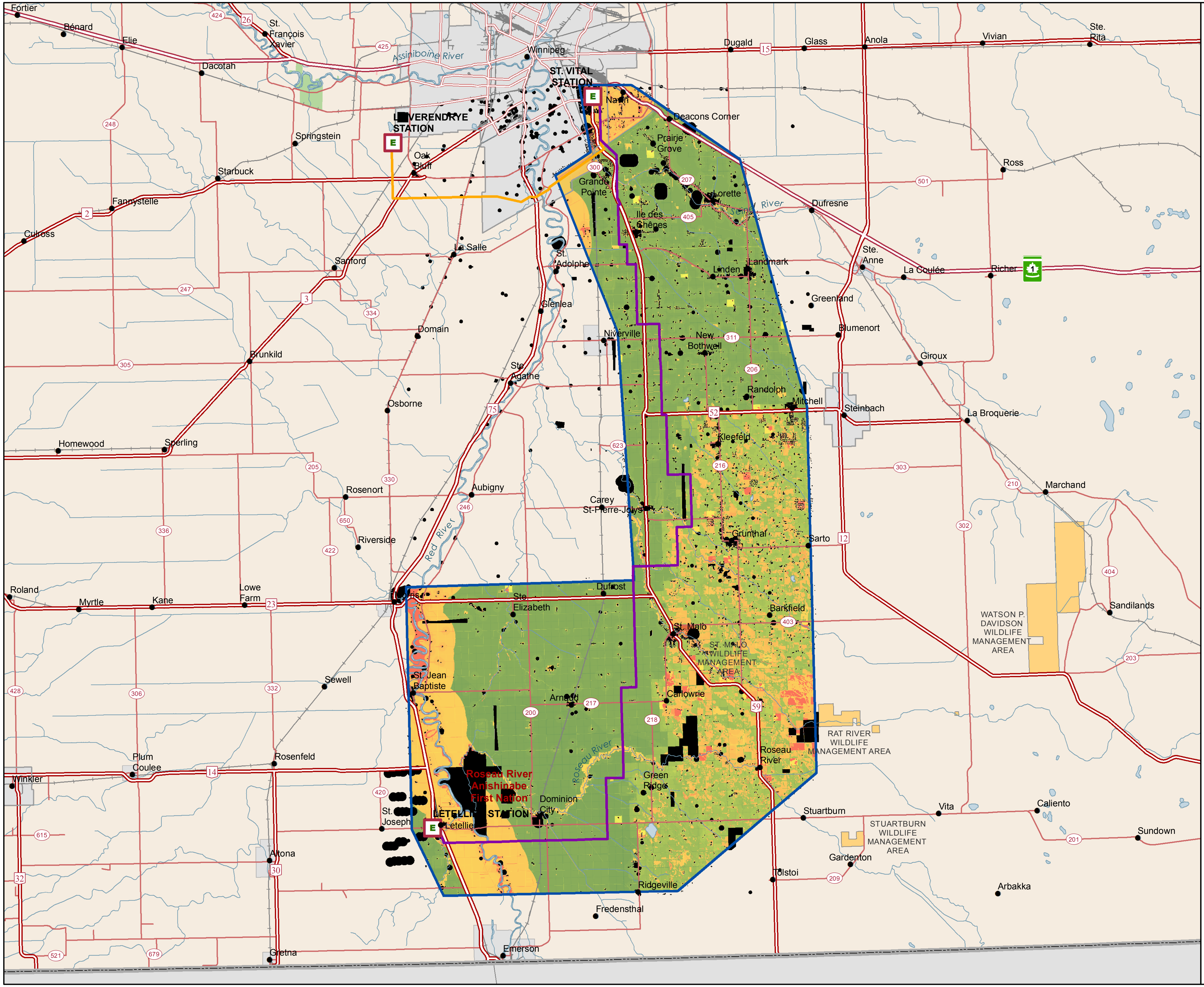
Suitability Surface Engineering Environment

Map 8-1



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- E Electrical Station
- Final Preferred Route (V95L)
- La Verendrye-St.Vital (Y36V) Transmission Line
- ▭ Project Siting Study Area

Suitability Surface

- ■ Areas of Least Preference

Natural Environment Emphasis

- Less Suitable
- More Suitable

Landbase

- ● Community
- Trans Canada
- Provincial Highway
- Provincial Road
- Railway
- ⬜ City / Town
- 🟥 First Nation
- 🟩 Provincial Park
- 🟨 Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN, Photo Science/Quantum Spatial
Date Created: May 15, 2014

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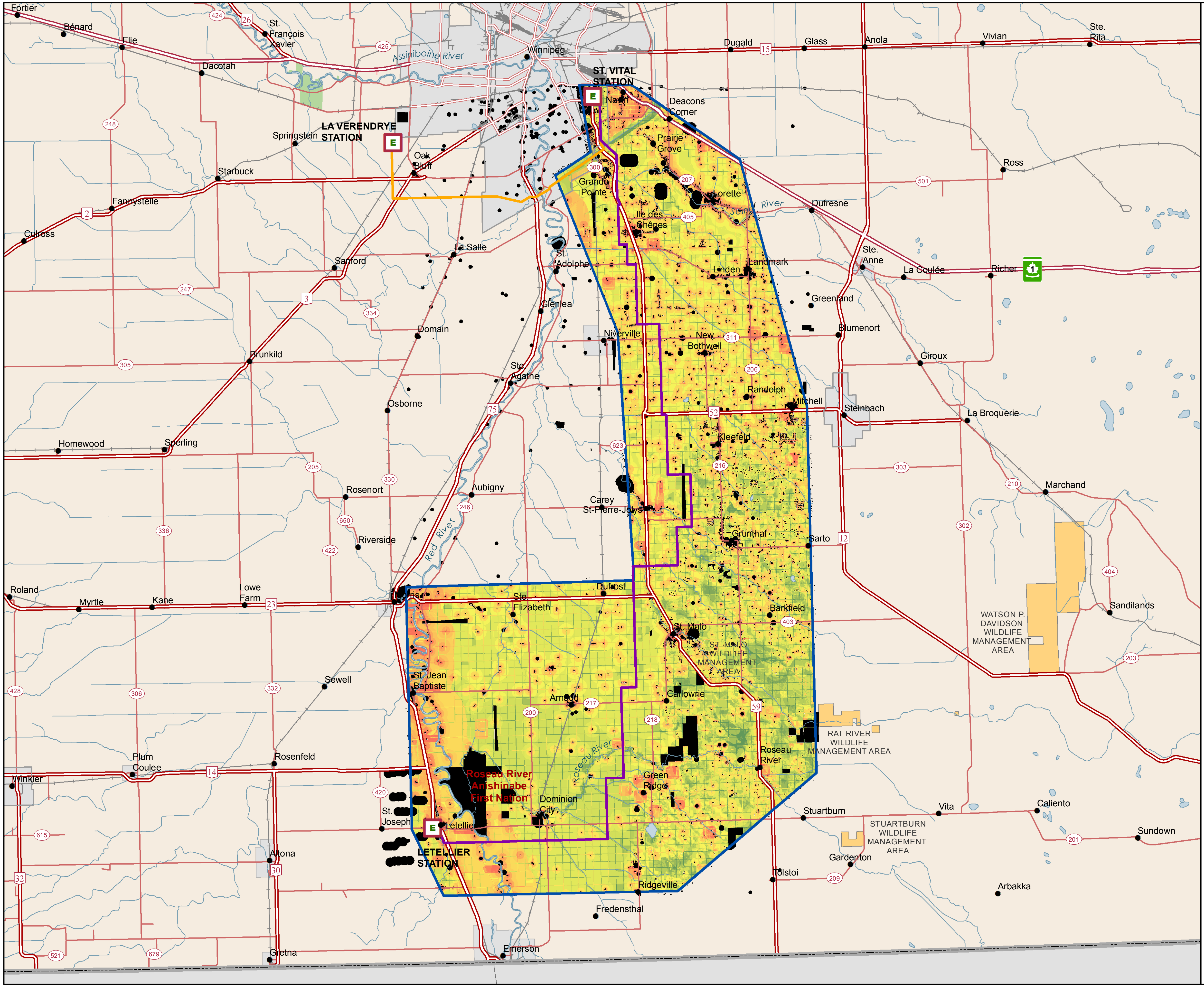
0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Suitability Surface Natural Environment

Map 8-2



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- E Electrical Station
- Final Preferred Route (V95L)
- La Verendrye-St.Vital (Y36V) Transmission Line
- Project Siting Study Area

Suitability Surface

- ■ Areas of Least Preference

Built Environment Emphasis

- Less Suitable
- More Suitable

Landbase

- ● Community
- Trans Canada
- Provincial Highway
- Provincial Road
- Railway
- City / Town
- First Nation
- Provincial Park
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN,
Photo Science/Quantum Spatial
Date Created: May 15, 2014

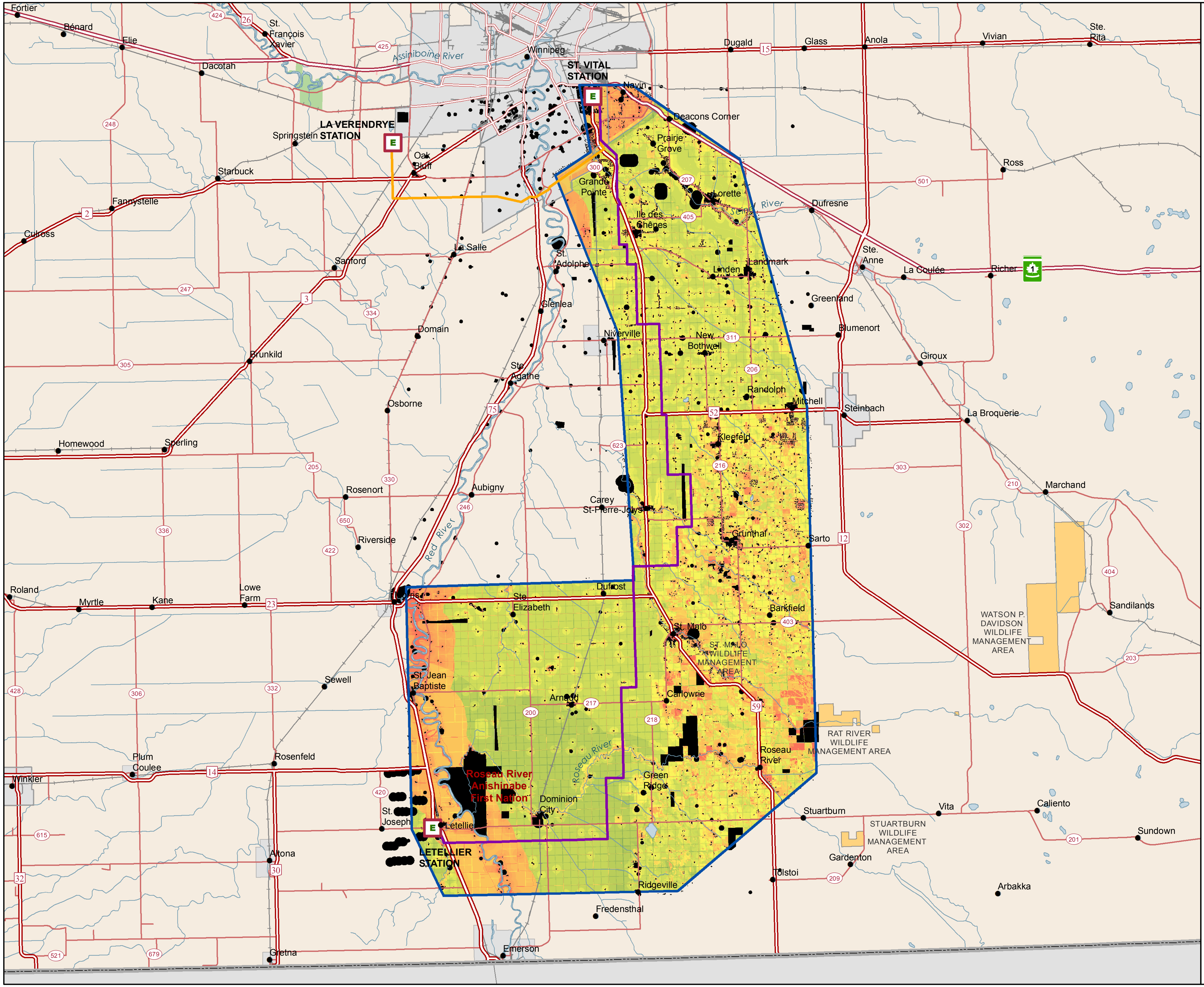
N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Suitability Surface Built Environment Emphasis

Map 8-3



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- E Electrical Station
- Final Preferred Route (V95L)
- La Verendrye-St.Vital (Y36V) Transmission Line
- Project Siting Study Area

Suitability Surface

- ■ Areas of Least Preference

Simple Average

- Less Suitable
- More Suitable

Landbase

- ● Community
- Trans Canada
- Provincial Highway
- Provincial Road
- Railway
- City / Town
- First Nation
- National/Provincial Park
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN, Photo Science/Quantum Spatial
Date Created: May 15, 2014

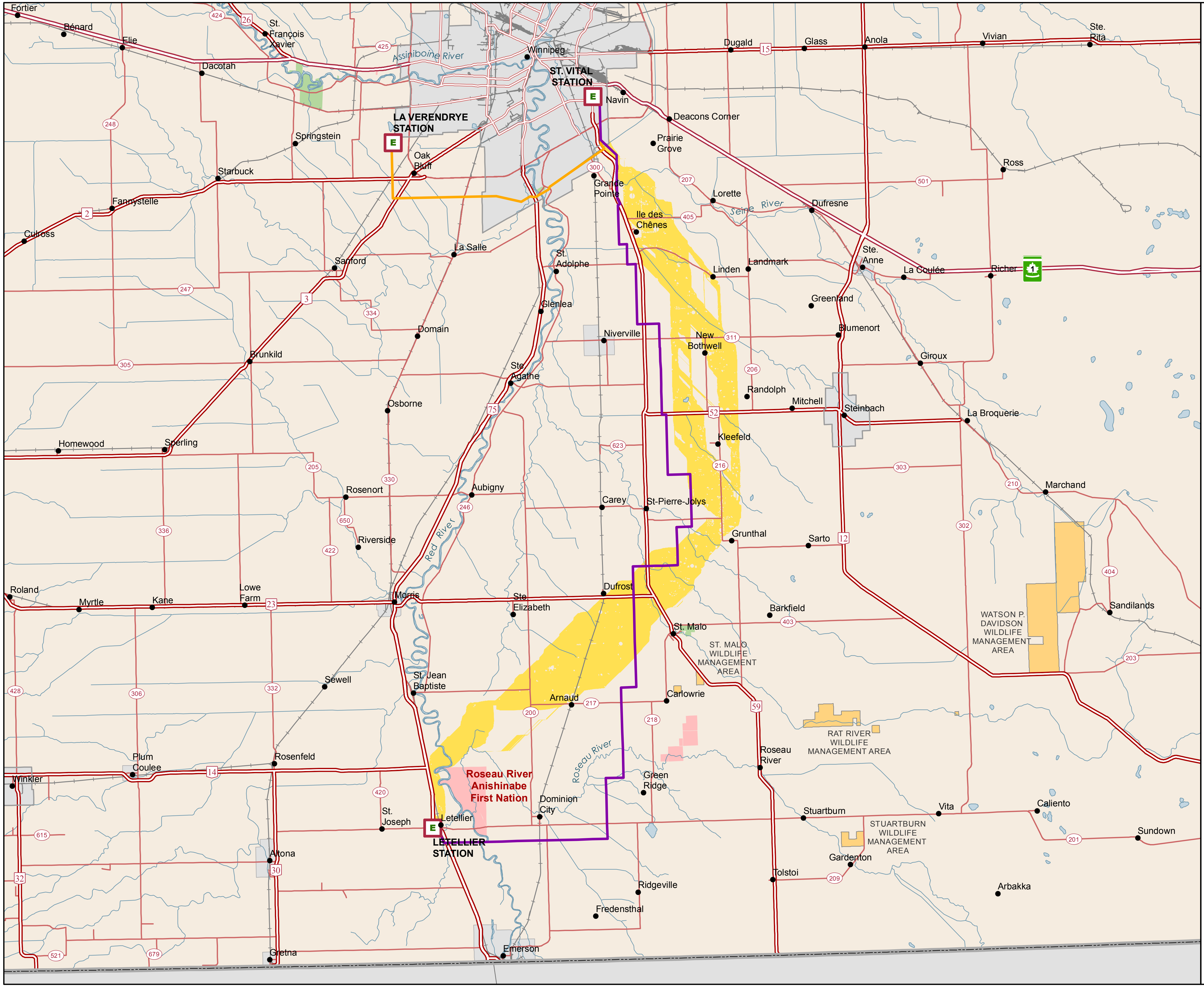
N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Suitability Surface Simple Average

Map 8-4



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- E Electrical Station
- ▬ Final Preferred Route (V95L)
- ▬ La Verendrye-St.Vital (Y36V) Transmission Line
- 🟨 Engineering Environment Alternate Corridor

Landbase

- ● Community
- 1 Trans Canada
- 20 Provincial Highway
- ― Provincial Road
- ┼ Railway
- ▨ City / Town
- 🟥 First Nation
- 🟩 Provincial Park
- 🟧 Wildlife Management Area

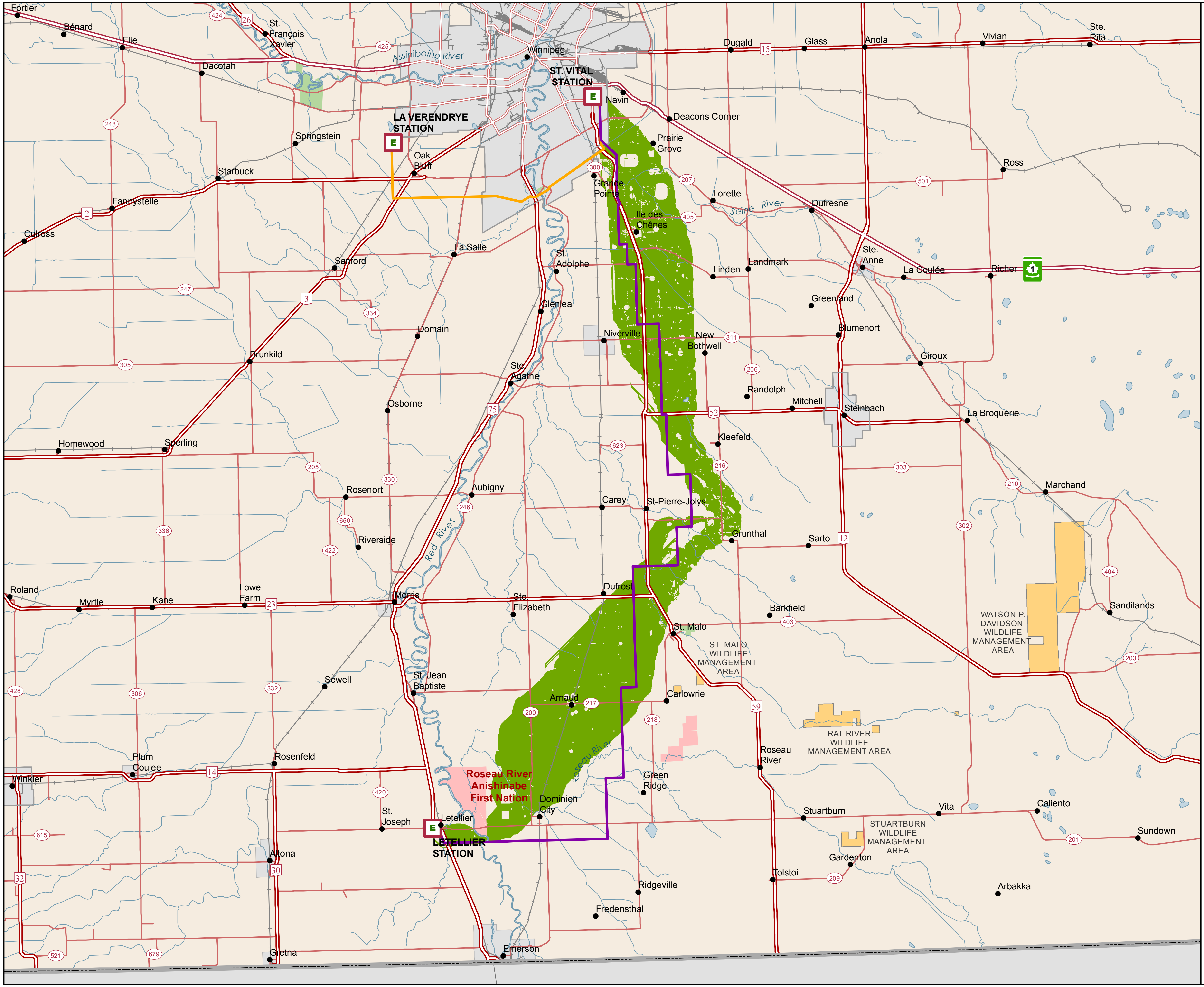
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN, Photo Science/Quantum Spatial
Date Created: May 15, 2014

N

0 5 10 Kilometres
0 2.5 5 Miles
1:400,000

Engineering Environment Alternate Corridor

Map 8-5



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

E	Electrical Station
—	Final Preferred Route (V95L)
—	La Verendrye-St.Vital (Y36V) Transmission Line
🟩	Natural Environment Alternate Corridor

Landbase

●	Community
1	Trans Canada
20	Provincial Highway
—	Provincial Road
+	Railway
▨	City / Town
🟥	First Nation
🟩	Provincial Park
🟨	Wildlife Management Area

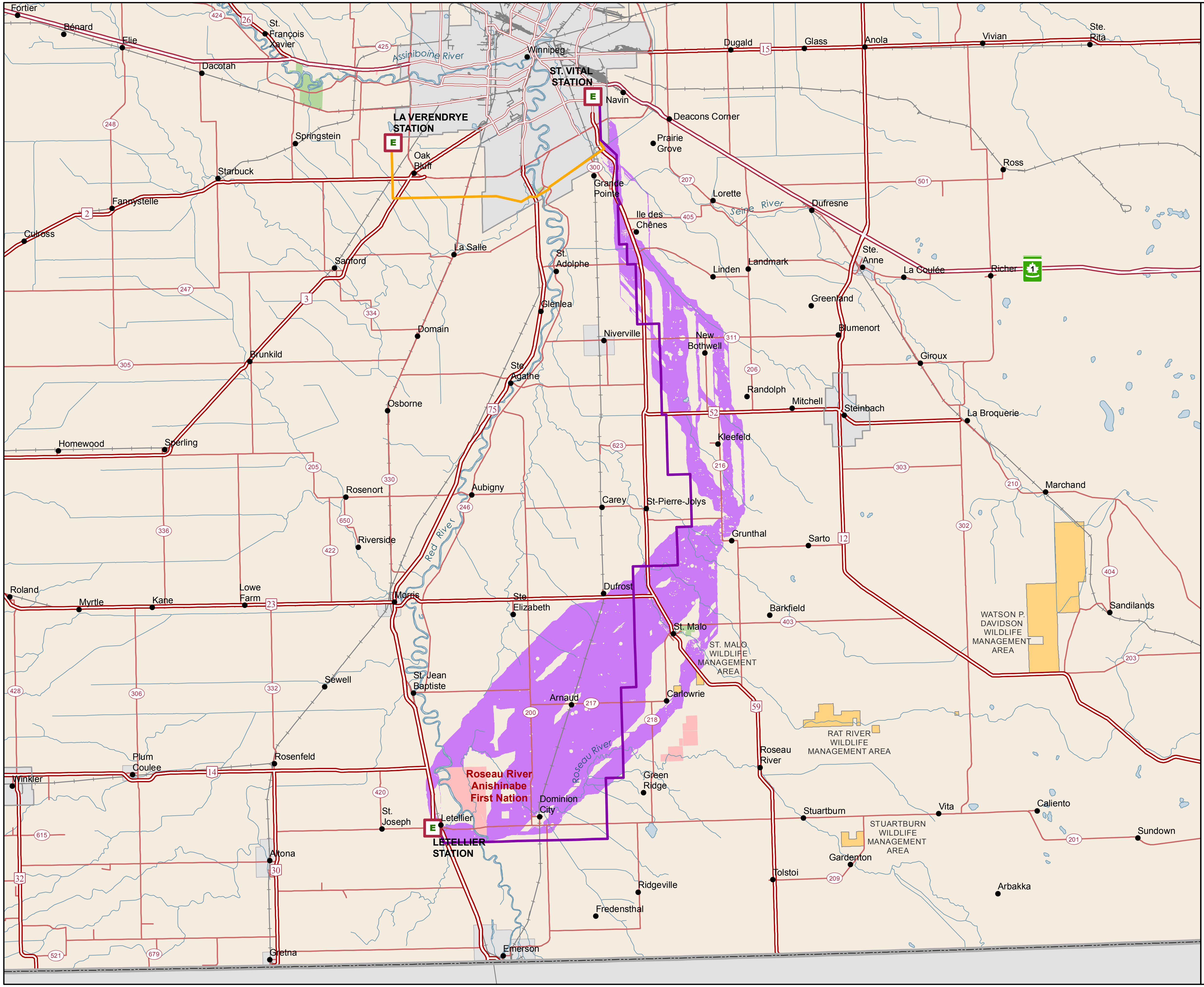
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN, Photo Science/Quantum Spatial
Date Created: May 15, 2014

N

0 5 10 Kilometres
0 2.5 5 Miles
1:400,000

Natural Environment Alternate Corridor

Map 8-6



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- E Electrical Station
- Final Preferred Route (V95L)
- La Verendrye-St.Vital (Y36V) Transmission Line
- Built Environment Alternate Corridor

Landbase

- ● Community
- 1 Trans Canada
- 20 Provincial Highway
- Provincial Road
- Railway
- City / Town
- First Nation
- Provincial Park
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN, Photo Science/Quantum Spatial
Date Created: May 15, 2014

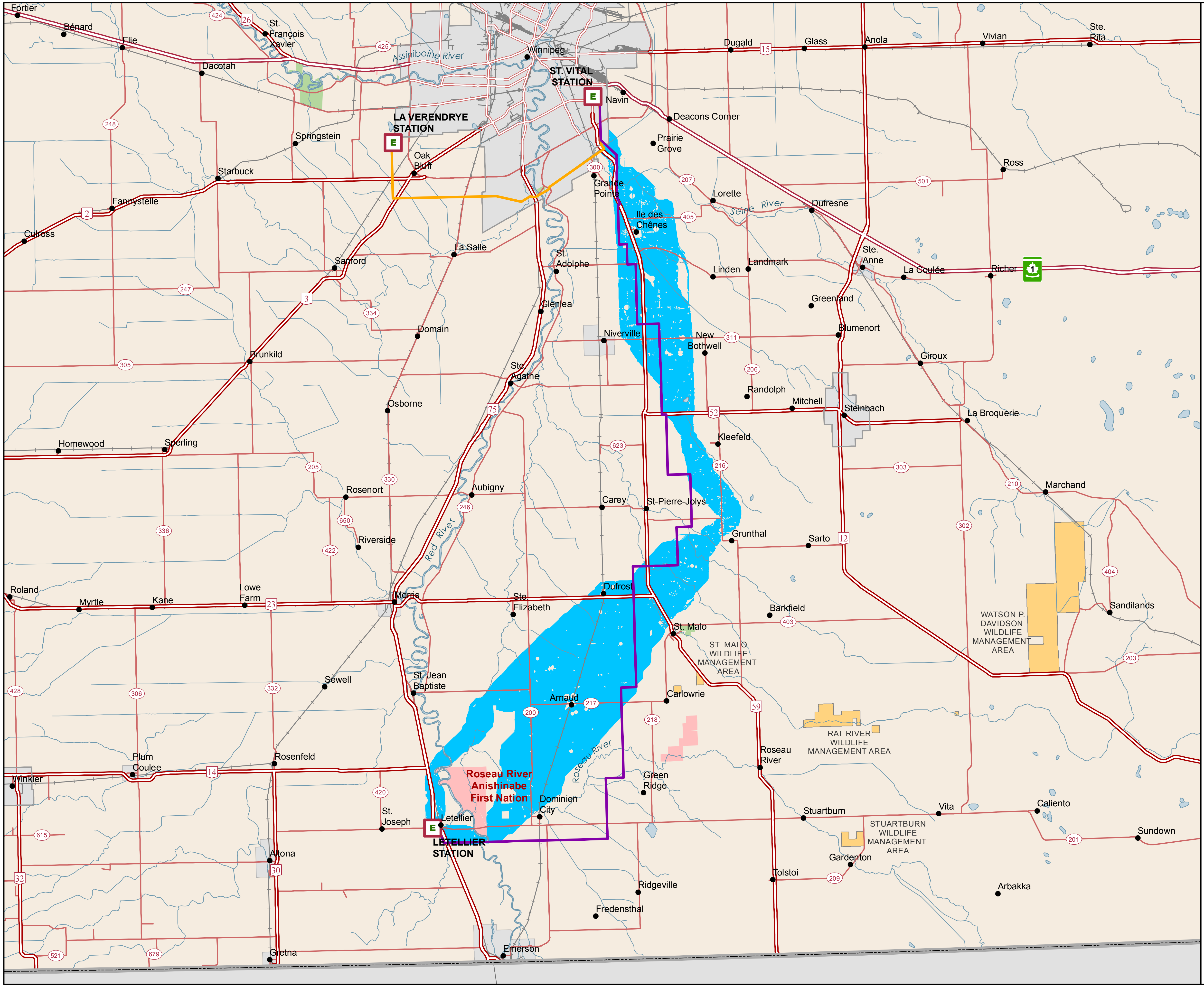
N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Built Environment Alternate Corridor

Map 8-7



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

E	Electrical Station
—	Final Preferred Route (V95L)
—	La Verendrye-St.Vital (Y36V) Transmission Line
🟦	Simple Average Alternate Corridor

Landbase

●	Community
1	Trans Canada
20	Provincial Highway
—	Provincial Road
—+—	Railway
▭	City / Town
▭	First Nation
🟩	Provincial Park
🟨	Wildlife Management Area

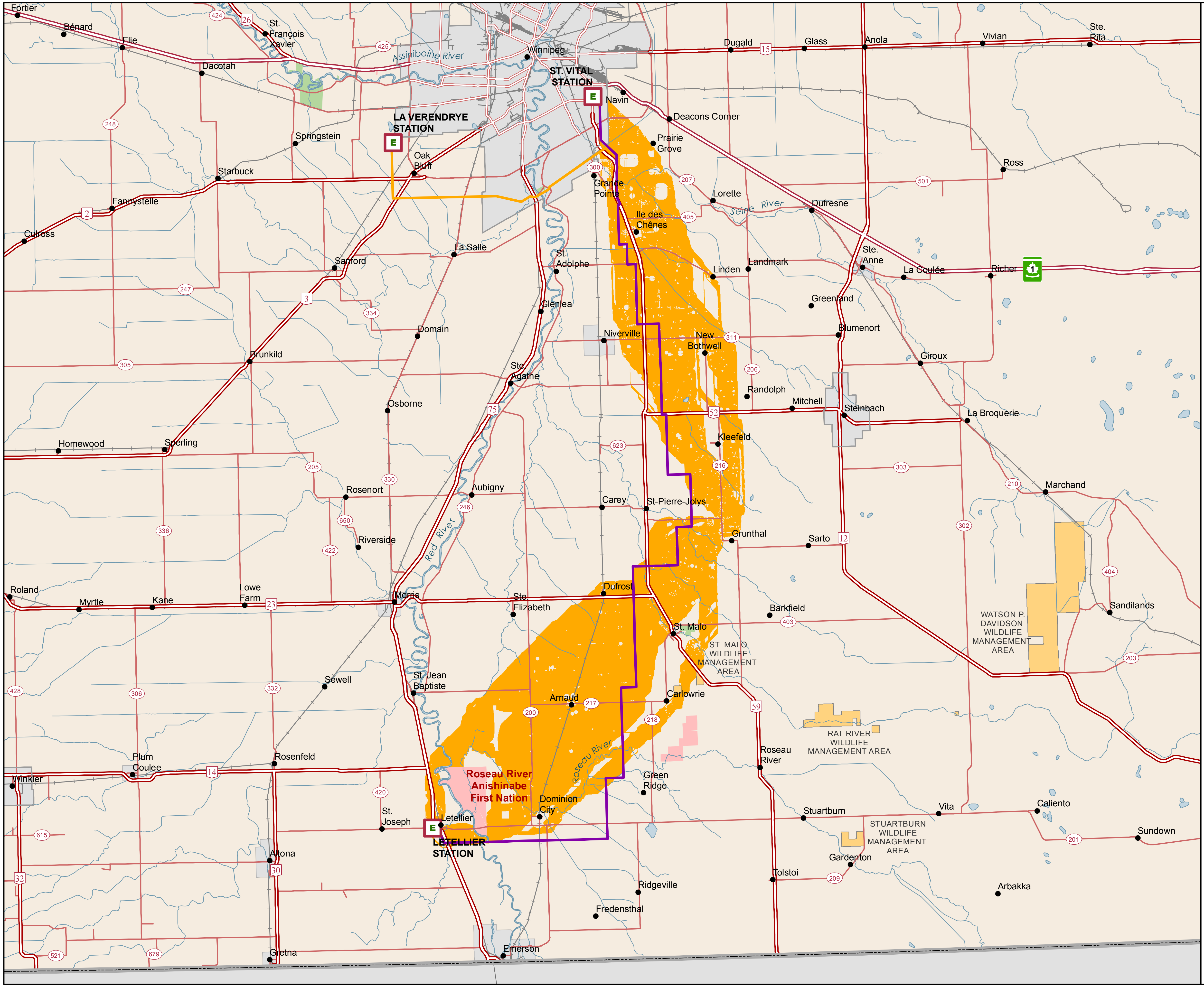
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN, Photo Science/Quantum Spatial
Date Created: May 15, 2014

N

0 5 10 Kilometres
0 2.5 5 Miles
1:400,000

Simple Average Alternate Corridor

Map 8-8



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- E Electrical Station
- ▬ Final Preferred Route (V95L)
- ▬ La Verendrye-St.Vital (Y36V) Transmission Line
- ▨ Composite of Alternate Corridors

Landbase

- ● Community
- 1 Trans Canada
- 20 Provincial Highway
- ▬ Provincial Road
- ┼ Railway
- ▨ City / Town
- ▨ First Nation
- ▨ Provincial Park
- ▨ Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN, Photo Science/Quantum Spatial
Date Created: May 15, 2014

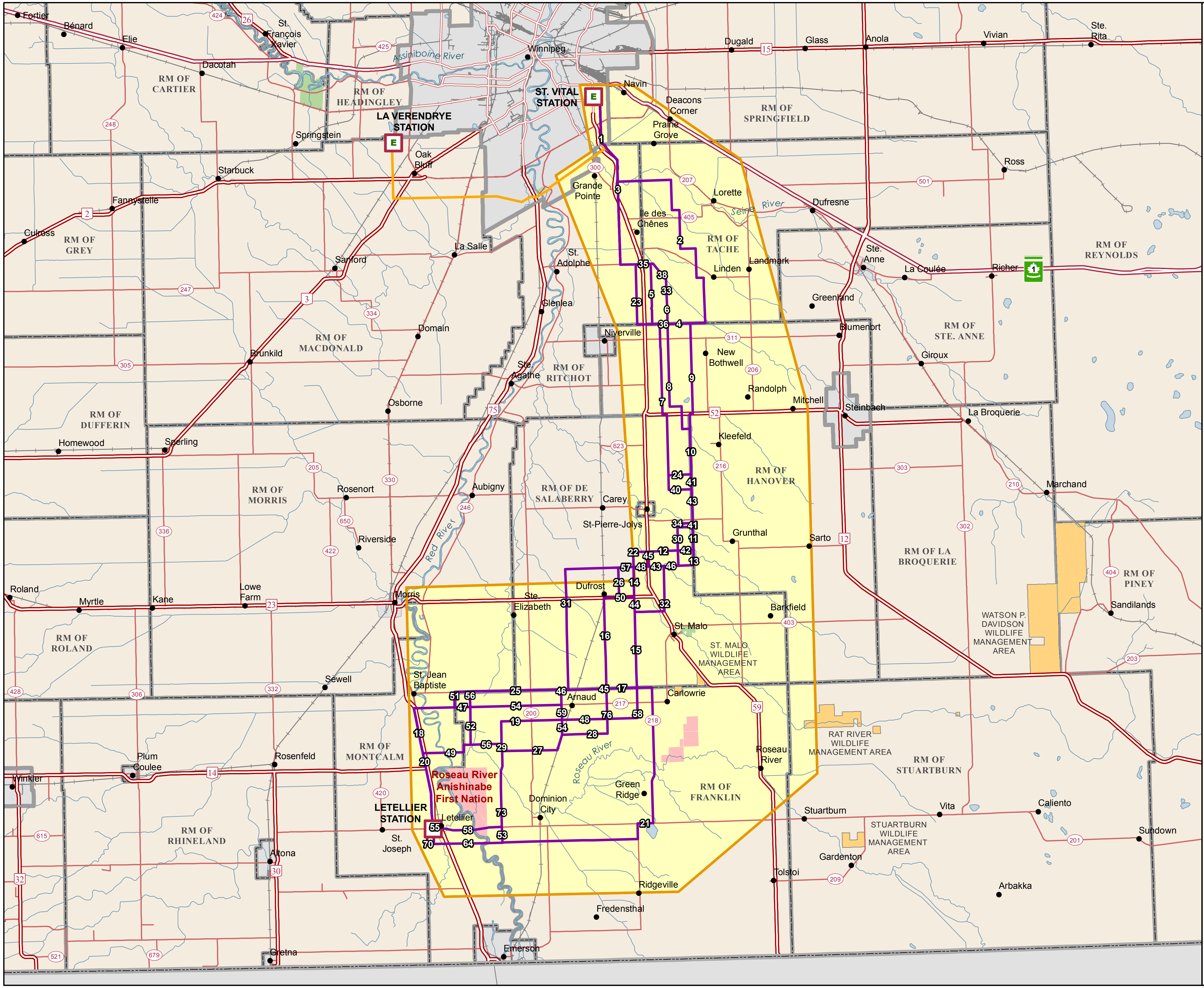
N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Composite of Alternate Corridors

Map 8-9



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- E Electrical Station
- Alternate Route Segment
- La Verendrye-St.Vital (Y36V) Transmission Line
- Project Siting Study Area

Landbase

- ● Community
- Trans Canada
- Provincial Highway
- Provincial Road
- Railway
- City / Town
- Rural Municipality
- First Nation
- Provincial Park
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 15, 2014

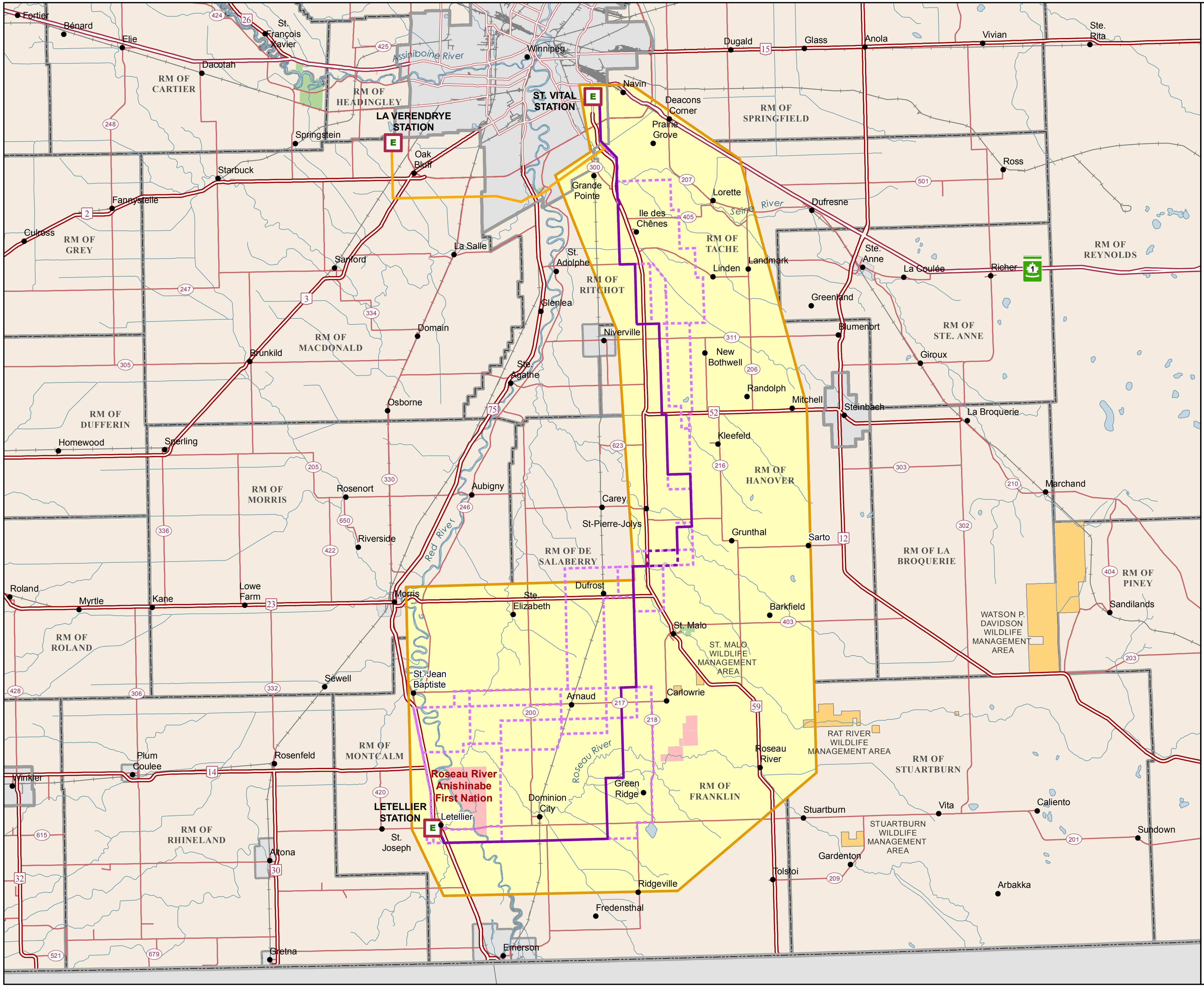
N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Alternate Route Segments

Map 8-10



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

E	Electrical Station
━	Preliminary Preferred Route (V95L)
╍	Potential Routing Option
╍	Alternate Route Segment
━	La Verendrye-St.Vital (Y36V) Transmission Line
▭	Project Siting Study Area

Landbase

●	Community
1	Trans Canada
20	Provincial Highway
─	Provincial Road
┼	Railway
▭	City / Town
▭	Rural Municipality
▭	First Nation
▭	Provincial Park
▭	Wildlife Management Area

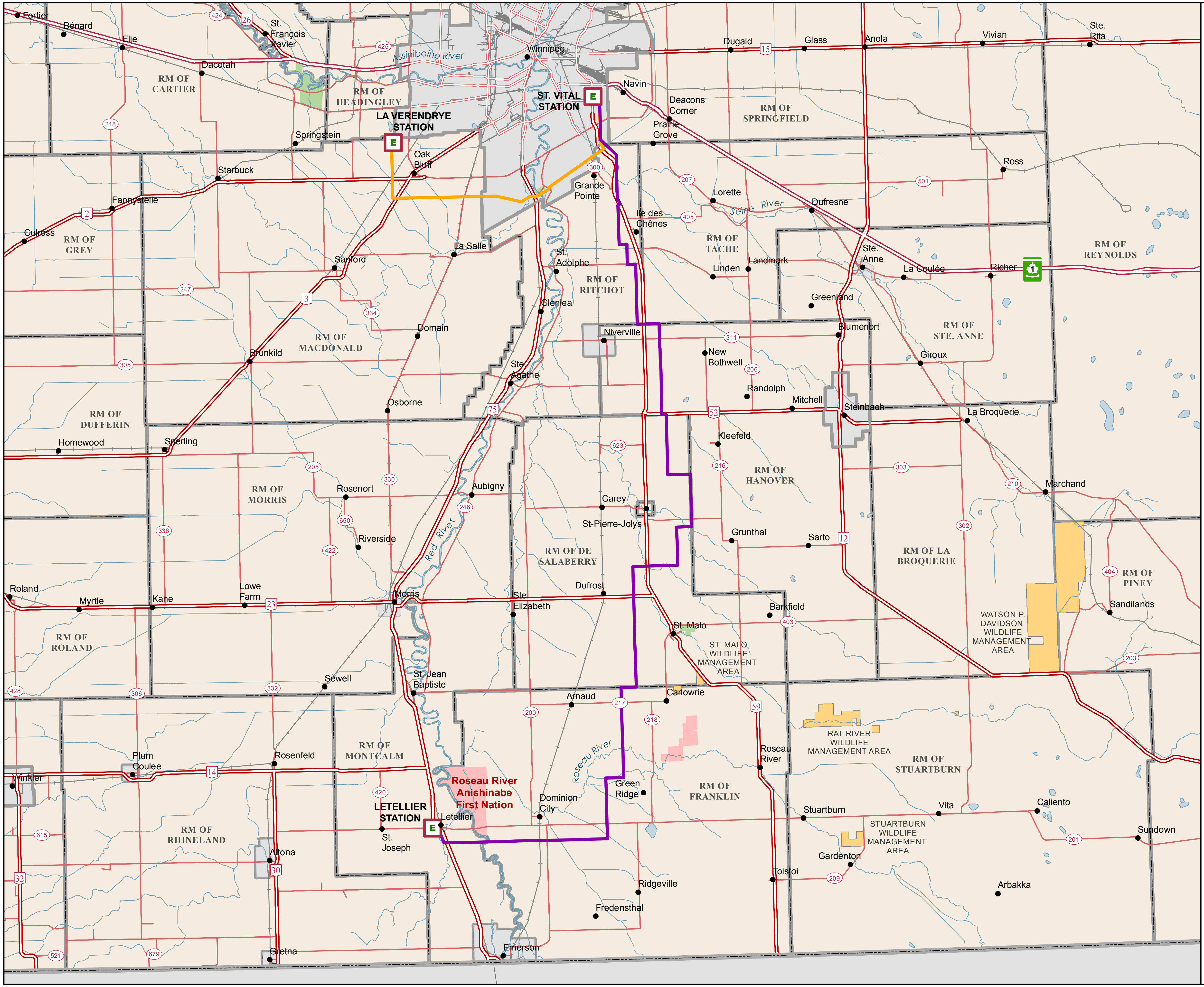
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 15, 2014

N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Preliminary Preferred Route



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

E	Electrical Station
━	Final Preferred Route (V95L)
━	La Verendrye-St.Vital (Y36V) Transmission Line

Landbase

●	Community
1	Trans Canada
20	Provincial Highway
━	Provincial Road
┼	Railway
▭	City / Town
▭	Rural Municipality
🟥	First Nation
🟩	Provincial Park
🟧	Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 15, 2014

N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Final Preferred Route

9.0 EFFECTS ASSESSMENT AND MITIGATION

This chapter details the assessment of Project effects on the various Valued Components (VCs) that were selected for the assessment. Each section will detail a specific VC, providing details on the scope of the assessment, the potential environmental effects, mitigation measures, residual effects and cumulative effects. This section will describe criteria introduced in previous chapters (e.g., Chapter 4, Environmental Assessment Process) such as direction, magnitude, geographical extent, direction, etc., using detail specific to the individual VC.

9.1 ATMOSPHERIC ENVIRONMENT

Atmospheric environment is a VC because of its importance to the health and well-being of humans, wildlife and other biota. The atmosphere is a pathway for the transportation of contaminants to freshwater, terrestrial and human environments.

Potential for effects on the atmospheric environment are predicted by assessing the potential for changes to air quality. Potential changes in air quality can result from vehicle use (i.e., engine exhaust and hydrocarbon vapours), from burning of cleared material (products of complete and incomplete combustion), and from construction and clearing efforts (dust emissions) with potential to affect local air quality and visibility.

9.1.1 Scope of Assessment for Atmospheric Environment

9.1.1.1 Regulatory Setting

Air quality in Manitoba is regulated by the province’s Ambient Air Quality Objectives and Guidelines. These list maximum time-based pollutant concentration levels for the protection and preservation of ambient air quality within the Province of Manitoba (MBCWS 2012). The main legislative instruments at the federal level in Canada, for managing air quality, are the *Canadian Environmental Protection Act* (CEPA) and from Canada-wide standards that have been developed under the Canadian Council of Ministers of the Environment (CCME) Canada-Wide Accord on Environmental Harmonization (CCME 1998).

9.1.1.2 Boundaries

The temporal boundaries for the consideration of potential effects of the Project on the atmospheric environment include the duration of Project construction, operation and maintenance periods; see Section 3.7 for the Project construction schedule. Operation and maintenance of the Project will begin following construction and will be carried out until project decommissioning.

The potential for Project environmental effects will be temporary and intermittent, peaking during the construction phase, and will diminish to much lower levels during operation and maintenance phases of the project.

The spatial boundaries for the atmospheric environmental effects assessment are as follows:

Project Development Area (PDA): The PDA for the atmospheric environment includes the area within which all physical construction activities associated with the Project will take place. The PDA includes 119 km of transmission line between St. Vital Station and Letellier Station, and 37 km of transmission line between St. Vital Station and La Verendrye Station, and upgrades at the station sites (Map 9-1). For the purposes of this assessment, a 40 m ROW was used.

Local Assessment Area (LAA): The LAA for the assessment is a 3-km wide corridor (1.5-km buffer on either side of the ROW centreline) of the PDA (Map 9-1). One and a half kilometres on either side of the line is sufficient to encompassing the effect of atmospheric disturbance from Project-related traffic, equipment, and construction noise under most conditions.

Regional Assessment Area (RAA): The RAA is the same as the LAA as environmental effects to the atmospheric environment are not expected to occur beyond the LAA.

There are no administrative or technical boundaries identified for the atmospheric environment.

9.1.1.3 Identified Issues and Concerns

Public engagement dealt with providing the public with project information and receiving input from stakeholders, but did not solicit responses pertaining to air quality concerns. No concerns regarding the atmospheric environment or air quality were raised during public engagement activities undertaken for this Project.

9.1.2 Project Interactions with Atmospheric Environment

Table 9.1-1 presents the interactions between the Project and the atmospheric environment resulting in effects to air quality and visibility.

Table 9.1-1: Potential Project Interactions with Atmospheric Environment

Project Activities	Reduced Air Quality	Reduced Visibility
Construction Phase:		
Clearing	1	1
Drilling	1	0
Marshalling Yards	1	1
Tower Installation	1	0
Stringing Conductors	1	0
Presence of Materials and Equipment	1	1
Site Reclamation	1	1
Operation and Maintenance Phase:		
Project Presence	0	0
Maintenance of Infrastructure	1	0
Vegetation Management	1	0

KEY:

Project-related Environmental Effects were ranked as follows:

0 = No interaction.

1 = Interaction may occur; however, based on past experience and professional judgment, the resulting environmental effect is well understood and can be managed to acceptable levels through General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). No determination of significance of residual effects or cumulative effects assessment is warranted.

2 = Interaction may occur, and the resulting environmental effect may exceed acceptable levels without implementation of project-specific mitigation. Further assessment is warranted.

9.1.2.1 Justification and Rationale for Interactions Ranked as 1

Based on knowledge of the relative atmospheric loadings generated by the described clearing, construction, operations and maintenance activities related to this project, the interactions of the Project with the atmospheric environment have been rated as 0, 1, or 2. Where there is an interaction, the use of standard mitigation procedures will reduce any effects to acceptable levels.

9.1.3 Residual Environmental Effects Description Criteria

Potential environmental effects of all Project-related activities on atmospheric environment were ranked as 0 or 1 in Table 9.1-1; therefore, no residual environmental effects description criteria or significance thresholds are defined for this VC.

9.1.4 Existing Conditions for Atmospheric Environment

9.1.4.1 Baseline Data Sources

Manitoba Conservation, a department of the Government of Manitoba, maintains an ambient air-quality-monitoring program for specific locations within the Province of Manitoba. In addition to the Province's set of air-quality monitoring stations, a few additional stations have also been established under *The Environment Act* requirements specific to companies with operations in Manitoba. The provincial network of ambient air-monitoring stations has been in place since 1968. Manitoba Conservation's Air Quality Division issues annual reports for Manitoba's monitored ambient air quality and the most recent report issued (at the time of this study) covers the years 2003 to 2005 inclusively. Manitoba Conservation's air-quality monitoring program includes only dedicated monitors in permanent stations, and these stations fall into the categories of either General/Urban Air Quality or Industrial (source-specific) monitoring. Manitoba's monitoring network includes only urban centres such as Winnipeg, Brandon, Thompson and Flin Flon. There are no ambient air-quality monitors in remote and/or rural locations.

9.1.4.2 Baseline Overview

Air quality in Manitoba is rated by Environment Canada as "generally good," with the exception of local issues related to industrial sources or vehicle emissions (Krawchuk and Snitowski 2008). Industrial sources and/or high vehicle traffic are mainly concentrated in urban areas or at point-source locations in rural areas. The LAA is predominantly agricultural, resulting in good air-quality conditions for the majority of the year. The exception may occur at harvest time when local air quality can be affected by increased vehicular and equipment emissions and particulate matter from harvesting activities and reduced visibility from local crop residue burning programs.

9.1.5 Project Environmental Effects on Atmospheric Environment

Potential environmental effects of all Project-related activities on atmospheric environment were ranked as 0 or 1 in Table 9.1-1; therefore, no determination of significance of residual or cumulative environmental effects are conducted for this VC.

Changes in air quality resulting from Project activities may include:

- Emissions from internal combustion engine operation from construction vehicles and support vehicles in the construction vehicle fleet.
- Dusts generated by construction vehicle movements, movement of materials and clearing efforts.

- Emissions of products of complete and incomplete combustion, generated as a result of disposal by burning of cleared materials within ROW.
- Emissions related to vehicular traffic resulting from operation and maintenance programs.
- Emissions, dust generation and potential odour concerns stemming from vegetation management programs and related products, equipment and traffic and personnel movements.

9.1.5.1 Mitigation

To mitigate the emissions from internal combustion engines used for construction, low-sulphur diesel fuels will be used and unnecessary idling restricted. This will also reduce greenhouse-gas (GHG) emissions during the construction of the Project. Proper maintenance of construction vehicles and equipment to emission standards will also mitigate potential effects.

Clearing activities along the ROW will involve the cutting, piling and burning of slash, resulting in emissions that will potentially affect local air quality. Burning will only be carried out under suitable weather conditions and will be confined to the cleared ROW. Burning will be supervised at all times and will be suspended if there is an occurrence of off-site drift of smoke that could cause nuisance or visibility issues for transportation or surrounding activities.

Manitoba Hydro has standard protocols in place, which would minimize potential effects on air quality if a contingency event such as fire occurred. The St. Vital, Letellier and La Verendrye stations will be operated in accordance with Manitoba Hydro’s Fire Manual.

9.1.5.2 Characterization of Residual Environmental Effects on Atmospheric Environment

The environmental effects of the Project on the atmospheric environment will be greatest during the construction phase and will consist of short-term, local increases in vehicle and equipment emissions, dust, particulates and smoke generated from the burning of cleared material. As the air quality in rural Manitoba is very good and the Project activities are mostly away from urban areas, there are limited effects on air quality or visibility for workers or any surrounding public, including rural residential inhabitants as well as residents of the towns and villages in the area.

The effects of operation and maintenance activities on the atmospheric environment will be minimal, as inspection and maintenance patrols of the ROW, structures and hardware are typically undertaken only two or three times per year. Non-scheduled patrols or maintenance may also be conducted by ground or air should unexpected repairs to the lines be required. Potential effects are not expected to be a concern as the effects will be short-term in duration, intermittent in nature (consistent with fluctuations in construction effort and clearing program intensity), and localized.

With adherence to proper mitigation procedures, potential effects on local air quality resulting from the construction, operations and maintenance activities will likely remain below stated limits for Manitoba Ambient Air Quality Guidelines. Potential for temporary exceedance of ambient air quality criteria is possible with any burning program associated with vegetation clearing; however, the likelihood of this condition will be minimized through adherence to provincial burning permits and refraining from conducting burning at night time. In addition, burning programs will be conducted such that they do not take place in an unsafe manner that affects roadway visibilities or public health.

9.1.6 Cumulative Environmental Effects on Atmospheric Environment

Project environmental effects on the Atmospheric Environment may interact with those of harvesting activities (e.g., fugitive dust generation during combining, decreased air quality resulting from burning slash, etc.) during the harvesting season. The effect of the combined activities, should they occur, is not expected to result in exceedances of the Manitoba Ambient Air Quality Objectives and Guidelines.

9.1.7 Follow-up and Monitoring

No specific follow-up or monitoring regarding potential change in air quality is planned.

9.1.8 Summary

Construction of the Project will result in minimal effects on local air quality during the construction period. During Project operations, little or no effect on air quality is anticipated.

9.2 GROUNDWATER RESOURCES

Groundwater resources was selected as a VC due to the documented existence of shallow groundwater resources in the project area and in recognition of the role shallow groundwater plays in supplying the water needs of nearby residents, agricultural operations and surrounding industries. Additionally, groundwater resources are often connected with surface water and aquatic resources, therefore changes to shallow groundwater quality could affect surface water and aquatic resources and habitat.

The assessment of groundwater resources focuses on near surface groundwater resources, specifically sand and gravel aquifers, and areas of artesian conditions. Project interactions with groundwater resources have the potential to effect shallow groundwater quantity and quality.

9.2.1 Scope of Assessment for Groundwater Resources

9.2.1.1 Regulatory Setting

Groundwater resources in Manitoba are regulated by *The Ground Water and Water Well Act (2008), The Groundwater and Water Well and Related Amendments Act (2012),* and associated regulations. The purposes of the Act are to: *"(a) to provide for the protection and stewardship of Manitoba's aquifers and groundwater; (b) to ensure that the construction, maintenance and sealing of wells and test holes meet standards that protect (i) the environmental quality of Manitoba's aquifers and groundwater, and (ii) human health and safety; and (c) to provide for the collection and sharing of well, aquifer and groundwater information to better understand, manage, conserve, protect, develop and use Manitoba's aquifers and groundwater."*

Components of *The Groundwater and Water Well and Related Amendments Act (2012)* relevant to groundwater resources pertain to issues of:

- Suspected contamination.
- Cessation of construction if contamination is found or suspected.
- Sealing to stop where contamination is found.
- Sealing of flowing artesian, saline, contaminated, and suspected contaminated wells and test holes.
- Control of flow from a flowing artesian well or test hole during and upon completion of construction.
- Sensitive groundwater areas.

9.2.1.2 Boundaries

The temporal boundaries for the assessment of the potential environmental effects of the Project on groundwater resources include the duration of Project construction, operation and maintenance; see Section 3.7 for the Project construction schedule. Operation and maintenance of the Project will begin following construction and will occur throughout the life of the Project. The potential for Project environmental effects on groundwater resources will peak during construction, and will diminish during operation and maintenance phases.

The spatial boundaries for the environmental effects assessment of groundwater resources are as follows:

Project Development Area (PDA): The PDA for the groundwater resources environment includes the area within which all physical construction activities associated with the Project will take place. The PDA includes 119 km of transmission line between St. Vital Station and Letellier Station, and 37 km of transmission line between St. Vital Station and La Verendrye Station, and upgrades at the station sites (Map 9-2). For the purposes of this assessment, a 40-m ROW was used.

Local Assessment Area (LAA): The LAA includes the PDA and is defined as a 1 km wide corridor, with 500 m on either side of the ROW centreline. This is the maximum area where project-specific potential environmental effects on Groundwater Resources are likely to occur and can be predicted or measured with a reasonable degree of accuracy and confidence.

Regional Assessment Area (RAA): The RAA includes the LAA and is defined as a 5 km wide corridor, with 2.5 km on either side of the ROW centerline and is considered to be the area within which potential cumulative environmental effects stemming from Project-related construction and operation and maintenance may occur (Map 9-2).

There are no administrative or technical boundaries for the assessment of groundwater resources.

9.2.1.3 Identified Issues and Concerns

Public engagement activities included stakeholder workshops and public open house events. At these events, individuals were provided the opportunity to comment and / or raise concern with respect to Project development. No issues pertaining to project effects on groundwater resources were identified by public engagement participants.

9.2.2 Project Interactions with Groundwater Resources

Table 9.2-1 lists anticipated Project activities and physical works, and ranks interactions as 0, 1, or 2 based on the level of interaction each activity or physical work will have with groundwater resources.

Table 9.2-1: Potential Project Environmental Effects on Groundwater Resources

Project Activities and Physical Works	Potential Environmental Effect	
	Change in Groundwater Quantity	Change in Groundwater Quality
Construction		
Clearing	0	0
Drilling	1	1
Marshaling Yards	0	0
Tower Installation	1	1
Stringing Conductors	0	0

Table 9.2-1: Potential Project Environmental Effects on Groundwater Resources

Project Activities and Physical Works	Potential Environmental Effect	
	Change in Groundwater Quantity	Change in Groundwater Quality
Presence of materials and Equipment	0	0
Site Reclamation	0	0
Operation		
Project Presence	0	0
Maintenance of Infrastructure	0	0
Vegetation Management	0	1

KEY:

Project-related Environmental Effects were ranked as follows:

0 = No interaction.

1 = Interaction may occur; however, based on past experience and professional judgment, the resulting environmental effect is well understood and can be managed to acceptable levels through General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). No determination of significance of residual effects or cumulative effects assessment is warranted.

2 = Interaction may occur and the resulting environmental effect may exceed acceptable levels without implementation of project-specific mitigation. Further assessment is warranted.

9.2.2.1 Justification and Rationale for Interactions Ranked as 1

The effects of interactions rated 1 are expected to have non-substantive interaction with groundwater resources, or will be managed to acceptable levels through the planned implementation of well-established mitigation measures.

The main potential issue relevant to shallow groundwater and transmission line construction pertains to drilling for tower foundations, especially in flowing artesian well areas. Normal pile foundation construction procedures, described in Chapter 3 (Project Description), could intersect an aquifer but are not expected to negatively affect groundwater resources in terms of either flow or quality. However, in flowing well areas the potential exists for disturbance from construction activities, including geotechnical drilling or foundation installations, to result in a direct groundwater discharge to the surface or interconnections of aquifers, if auger holes are not sealed properly or quickly enough. In the event of an unintended groundwater discharge to the surface, there is a potential for a local drop in the aquifer level and/or an effect on the surficial environment (soils and/or surface water), especially in the southwest where the carbonate aquifer might be intersected and is saline. Interconnections of artesian saline aquifers with potable aquifers may result in degradation of shallow groundwater quality. The effect on the surficial environment from an unintended discharge is dependent on a number of factors including, among other things, the salinity of the discharging groundwater, the quantity of groundwater discharged, and the proximity of receiving streams or sensitive vegetation/habitats. The areas with known saline flowing artesian wells or springs are considered to have a higher risk of such an event.

Implementation of effective mitigation measures including general environmental protection measures (Chapter 10), beneficial management practices, standard operating procedures, environmental protection plans and environmental restoration plans are expected to manage residual effects to acceptable standards, and as such, these interactions have been rated as 1.

9.2.2.2 Selection of Key Indicators

Groundwater resources consist of water located beneath the earth's surface in **pore spaces** of soils and fractures of rock formations. For consideration in this assessment, groundwater resources have been divided into two aspects: groundwater quality/quantity, and groundwater quantity in areas of flowing artesian well conditions.

- **Groundwater quality and quantity** refers to the chemical and physical characteristics of groundwater that provide measures to which the condition of groundwater relative to the requirements for which it is being utilized (e.g., livestock and industrial purposes, human consumption, etc.) can be determined.
- **An artesian aquifer is a confined aquifer containing groundwater** under positive pressure which, if high enough, could cause water to reach the surface during drilling activities. Groundwater quantity in areas of flowing artesian well conditions refers to the potential for groundwater discharge in areas underlain by an artesian aquifer, which could reduce the quantity of water available relative to the requirements for which it is used.

9.2.2.3 Selection of Environmental Effects and Measurable Parameters

The potential environmental effects on groundwater resources associated with Project-related activities focused on:

- Changes in shallow groundwater quantity and quality of sand and gravel aquifers.
- Change in shallow groundwater quantity in areas of flowing artesian aquifers.

The selection of these environmental effects is based on the previously identified regulatory requirements (Section 9.2.1.1) in combination with the specific nature of Project activities that may interact in some measurable way with groundwater resources.

Table 9.2-2 provides the measurable parameters for potential environmental effects on groundwater resources.

Table 9.2-2: Measurable Parameters for Groundwater Resources

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Changes in shallow groundwater quantity of sand and gravel aquifers and artesian aquifers, and change in shallow groundwater quality of sand and gravel aquifers.	Groundwater levels or productivity and groundwater chemical and physical characteristics.	• Provides quantification to identify changes in the shallow groundwater which is available to users. • Provides quantification to identify changes in the quality of shallow groundwater due to use of herbicides.

NOTES:

1. Accidents and Malfunctions (e.g. spills, leaks) are addressed in Section 9.19.

9.2.3 Residual Environmental Effects Description Criteria

Potential environmental effects of all Project-related activities on groundwater resources were ranked as 0 or 1 in Table 9.2-1; therefore, no residual environmental effects description criteria or significance thresholds are defined for this VC.

9.2.4 Existing Conditions for Groundwater Resources

9.2.4.1 Baseline Data Sources

To characterize the baseline conditions for groundwater resources, the following sources of information were reviewed:

- Groundwater resource reports covering all or parts of the RAA.
    - Betcher et al. 1995. Groundwater in Manitoba: hydrogeology, quality concerns, management. NHRI Contribution No. CS-93017. Available online at: http://www.manitoba.ca/waterstewardship/reports/groundwater/hg_of_manitoba.pdf
    - Grasby and Betcher. 2002. Regional hydrogeochemistry of the carbonate rock aquifer, southern Manitoba. Available at: http://web.viu.ca/earle/geol304/grasby-betcher.pdf
    - Rutulis, M. 1984. Groundwater resources in the RM of Tache Planning District; Manitoba Department of Natural Resources, Water Resources Branch, 1 figure, 4 maps.

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- Rutulis, M. 1987. Aquifer map of southern Manitoba, bedrock aquifers; Manitoba Water Resources Branch, 1:2 300 000.
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- Groundwater Information Network. 2013. Well data for the LAA.

9.2.4.2 Baseline Overview

There were no field surveys completed for the assessment of Project effects on \groundwater resources. Existing conditions for shallow groundwater resources were based on desktop reviews of existing reports (discussed in Section 5.4.2). Of all the rural municipalities traversed by the Project, detailed groundwater resource reports were only available for the Rural Municipalities of Springfield and Tache, and the Macdonald – Ritchot Planning District. Non-detailed, regional groundwater resource reports were used to characterize the groundwater resources for the remainder of the area.

Shallow Groundwater Resources

As discussed in Section 6.1.3 and shown in Map 9-2, the LAA traverses land underlain by lenses of sand and gravel aquifers but does not traverse major buried sand and gravel aquifers, which might be an essential source for surface water streams.

Areas with Flowing Artesian Well Conditions

Artesian groundwater conditions are environmentally sensitive areas because of the risk of potential interconnection between artesian aquifers and the surficial environment due to interception during drilling or foundation installations.

The LAA traverses three different areas with respect to flowing artesian well conditions; non-flowing artesian well areas in the north and south-central portions of the project area; a central area with fresh-water flowing artesian well conditions and a southwestern area with saline flowing artesian well conditions (Map 9-2). North of Tourond, Manitoba, the LAA traverses a non-flowing artesian well area. Between Tourond and Carlowrie, Manitoba, the LAA traverses a large freshwater flowing artesian well area. This flowing well area overlies the fresh water carbonate aquifer, east of the Red and Rat rivers where there is predominant domestic use of water from the carbonate aquifer (Groundwater Information Network [GIN] 2013). In the southwest portion of the LAA, there is an area of saline-flowing artesian well conditions that extends west. However, there is no groundwater use in this saline area (as evidenced by the absence of wells) where the carbonate aquifer might occur close to the surface and could be intercepted by the Project (GIN 2013).

Wells within the Groundwater Resources LAA

Groundwater well data (GIN 2013) was used to examine the uses of groundwater within the LAA. There is widespread use of groundwater within the LAA. Of the 201 wells found within a 500-m buffer on either side of the proposed transmission centreline, 62 (approximately 31%) are considered active for domestic use, while the status of 88 domestic wells (44%) is unknown. Ten wells (approximately 5%) are identified within the LAA as being active for livestock use, while the status of an additional 9 (4%) is unknown (Table 9.2-3). An additional 29 wells were identified within the LAA; however the use of these wells is unknown.

A review of the available borehole logs for the wells found within the LAA found the following:

- The dominant sequence of materials in the wells, with increasing depth, consists of mud, till, and carbonates bedrock.
- Gravel and sand layers are dominantly absent, and where they occur, they were found beneath the till layer, at depth (>15 m below the surface) and were only a few metres thick.
- The carbonate aquifer is the predominant well water source, as indicated by the solid well casings which were dominantly installed to the carbonate layer. In a few instances, casings were installed to non-carbonate bedrock, or sand, gravel and till layers.

For the wells located within the LAA, the Groundwater Information Network does not have well chemistry data; it only presents well log data and lithology. As shown in Map 9-2, within the LAA, wells are dominantly found north of Provincial Road (PR) 606, implying that surface water is the main water source south of PR 606.

No groundwater wells for domestic or livestock use were found to be located within the PDA, following a review of groundwater well data (GIN 2013).

Table 9.2-3: Summary Well Data for the Local Assessment Area for Groundwater Resources

Well Water Use	Well Status	No. of Wells in LAA	Depth of Well (m)
Domestic	Active	62	24-132
	Sealed	3	22-28
	Unknown	88	12-142

Table 9.2-3: Summary Well Data for the Local Assessment Area for Groundwater Resources

Livestock	Active	10	23-112
	Unknown	9	6-93
Other	Active	1	31
Unknown	Active	17	3-145
	Inactive	2	31
	Sealed	9	15-50
Total Number of Wells in LAA		201	

9.2.5 Project Environmental Effects on Groundwater Resources

Potential environmental effects of all Project-related activities on groundwater resources were ranked as 0 or 1 in Table 9.2-1; therefore, no determination of significance of residual or cumulative environmental effects are conducted for this VC.

9.2.5.1 Assessment of Change in Groundwater Quality and/or Quantity

9.2.5.1.1 Construction

As described in Section 3.4.1.2, during construction, physical disturbance from drilling and tower foundation installation may be completed 9 m below the ground surface, while breaker foundation installation at the St. Vital, Letellier and La Verendrye stations may require drilling to depths of approximately 12 m. These drilling activities have the potential to extend into the water table and affect shallow groundwater quantity (through discharge) and quality (through connecting non-saline with saline groundwater).

The majority of domestic and livestock wells are located east of the saline groundwater region, in non-flowing well and fresh water flowing well areas. Drawing water primarily from the carbonate aquifer, these wells are installed to a casing depth of at least 20 m. Potential effects to groundwater quantity from Project-related effects of construction are not anticipated, given that the depths of screens for existing domestic and livestock wells in the area are predominantly greater than 9 m (the anticipated limit of project construction activities related to tower foundation installations).

Discharge of groundwater from freshwater artesian areas (located in the central portion of the LAA) could affect the quantity of groundwater available for domestic use, where existing well screen depths are closer to the 9 m construction depth, given the number of domestic and livestock wells in the area.

Given that the carbonate aquifer occurs closer to the surface in the southwest than other areas to be traversed by the Project, the potential for connection of non-saline gravel aquifers to saline carbonate aquifers through drilling activities exists. A review of the domestic and livestock well data logs for the LAA indicated no active domestic or livestock wells in the southwestern portion of the Project area. Therefore, in this portion of the Project area, potential effects to domestic and livestock well water quality and quantity are not anticipated.

The discharge of water in saline water artesian areas located in the southwestern portion of the LAA, has the potential to result in non-groundwater effects. Drilling to depths of 12 m associated with upgrades to the Letellier station has the potential to discharge saline water. The effect on the surficial environment from an unintended discharge depends on the salinity and quantity of the discharged groundwater, and the proximity of receiving streams or sensitive vegetation/habitats. Successful implementation of mitigation measures should reduce the potential for changes to shallow groundwater quantity resulting from unintended discharges. Additionally, drilling activities stemming from upgrades to the St. Vital and La Verendrye stations (i.e., drilling to depths of 12 m for breaker foundations) are occurring in areas of non-artesian conditions and connection of aquifers is not anticipated, potential effects to groundwater resources are not expected.

9.2.5.1.2 Operation

During Project operations, application of herbicides for vegetation management along the ROW could affect shallow groundwater quality through leaching of applied herbicides. Under normal application conditions, most herbicide chemicals used in vegetation management programs degrade within the unsaturated zone above the water table (vadose zone).

Project-related operation and maintenance effects on groundwater resources are expected to be negligible. The stations will continue to operate as they currently do.Mitigation

Mitigation measures intended to minimize potential Project-related effects to groundwater quality and quantity to acceptable levels include, but are not limited to the following:

- Using qualified drillers with appropriate experience to work in areas underlain by artesian aquifers.
- Monitoring water levels during drilling and foundation installation.
- Having emergency response plans in place for sealing/grouting and pumping in artesian areas.
- Undertaking follow up inspections of installed foundations to monitor for excess moisture.
- Following all applicable permits and provincial regulations when using herbicides as required to control vegetation growth.

9.2.5.1.3 Characterization of Residual Change in Groundwater Quality or Quantity

Given the nature of the Project and the proposed mitigation, the potential environmental effects of all Project-related activities on groundwater resources were ranked as 0 or 1 in Table 9.2-1 and are not considered further in this EA.

9.2.6 Cumulative Environmental Effects on Groundwater Resources

Project environmental effects on groundwater resources are expected to be minimal, given the limited potential for and short duration of the Project’s shallow groundwater environment interactions. Other projects or activities that could affect shallow groundwater resources in the same area and time frame as those of the Project are primarily agricultural related (e.g., aquifer contamination through use of herbicides and pesticides, irrigation practices causing depressed water levels, etc.).

Based on the mitigation (beneficial management practices, standard operating procedures, compliance with applicable regulatory requirements and environmental protection plan), Project-related effects in combination with the effects of other identified past, current and future projects and activities are not expected to be discernible above baseline levels.

9.2.7 Follow-up and Monitoring

Tower foundations will be inspected for excess moisture as part of standard infrastructure inspections by Transmission Line Maintenance staff.

9.2.8 Summary

Construction of the Project will result in minimal effects on groundwater quantity and quality during the construction period. During Project operations, little or no effect on groundwater quantity or quality is anticipated.

9.3 AQUATIC RESOURCES

Aquatic resources have long been valued as a biological and natural resource by the public, federal and provincial regulatory authorities and have therefore been chosen as a VC. This assessment of aquatic resources focuses on surface-water quality and fish and fish habitat with attention given to Species of Conservation Concern (SOCC).

Project interactions (such as riparian vegetation clearing, tower installation, riparian vegetation maintenance at watercourse crossings) have the potential to result in effects to: surface-water quality (increased sedimentation, dissolved oxygen [DO], pH and total suspended sediments

[TSS] concentrations), SOCC, and fish habitat (e.g., spawning grounds; nursery, rearing and food supply areas; migration corridors).

9.3.1 Scope of Assessment for Aquatic Resources

9.3.1.1 Regulatory Setting

***The Fisheries Act* (1985)**

The Fisheries Act (1985 amended November 2013) provides the basis for the protection of fish habitat. This is done through Fisheries and Oceans Canada's Fisheries Protection Policy Statement (2013a) which enables Fisheries and Oceans Canada (DFO) the ability to manage threats to the sustainability and productivity of Canada's commercial, recreational and Aboriginal fisheries. This policy applies to all projects and activities in or near water.

***The Species at Risk Act* (2002)**

The *Species at Risk Act* (SARA) (2002) provides the basis for the protection of species at risk. 'Endangered,' 'Threatened,' and 'Species of Special Concern' fish species protected federally by the SARA (2002) are listed in Schedule 1 of the Act. As defined in SARA (2002), wildlife species means a species, subspecies, variety or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and (a) is native to Canada or (b) has extended its range into Canada without human intervention and has been present in Canada for at least 50 years. The purpose of the SARA (2002) is to protect wildlife species at risk and their critical habitat. The SARA (2002) is administered by Environment Canada, Parks Canada Agency, and Fisheries and Oceans Canada. Those species listed as 'Endangered' or 'Threatened' in Schedule 2 or 3 of SARA (2002) may also be considered as species at risk, pending regulatory review.

***Endangered Species Act* (1998)**

Endangered species are protected provincially under the Manitoba *Endangered Species Act* (MESA) (1998). The purposes of this Act are: (a) to ensure the protection and to enhance the survival of endangered and threatened species in the province; (b) to enable the reintroduction of extirpated species into the province; and (c) to designate species as endangered, threatened, extinct or extirpated. The *Threatened, Endangered and Extirpated Species Regulation* (M.R. 25/98) lists plants and wildlife considered threatened, endangered and extirpated in the province. Currently, the mapleleaf mussel (*Quadrula quadrula*) has been classified as 'Endangered' under this regulation (Table 9.3-1).

The Canadian Council of the Ministers of the Environment (1999) and *The Water Protection Act* (2005)

Surface-water quality is managed through federal guidelines and provincial standards, objectives and guidelines. The Canadian Council of the Ministers of the Environment (CCME) maintains guidelines for the protection of aquatic life for many water quality parameters. These guidelines are generally accepted in environmental assessment to mitigate project activities such that the CCME (1999) guidelines are not exceeded, where it is considered technically and economically feasible to do so. The water quality of watercourses in Manitoba is protected under *The Water Protection Act* (2005) through the Manitoba Water Quality Standards, Objectives, and Guidelines (Manitoba Water Stewardship 2011).

9.3.1.2 Boundaries

The temporal boundaries for potential environmental effects assessment of the Project on aquatic resources include the duration of the Project construction and operation and maintenance; see Section 3.7 for the Project construction schedule. Operation and maintenance of the Project will begin following construction and will continue throughout the life of the Project.

The potential for effects to aquatic resources is highest during the construction phase when Project-related activities are occurring in proximity to watercourses. During the operation and maintenance phases, potential Project-related effects to aquatic resources will only occur when vegetation management activities occur in proximity to watercourses.

The spatial boundaries for the environmental effects assessment of aquatic resources are defined below.

Project Development Area (PDA): The PDA for the Aquatic Environment includes the area within which all physical construction activities associated with the Project will take place. The PDA includes 119 km of transmission line between St. Vital Station and Letellier Station, and 37 km of transmission line between St. Vital Station and La Verendrye Station, and upgrades at the station sites (Map 9-3). For the purposes of this assessment, a 40 m ROW was used.

Local Assessment Area (LAA): The LAA, consists of the Project PDA and extends 150 m both upstream and downstream of watercourses crossed by the Project, extending from the project centerline and including those boundaries at the watercourse crossings. The LAA represents the area where indirect or secondary effects of construction and operation and maintenance on aquatic resources are likely to be most pronounced or identifiable.

Regional Assessment Area (RAA): The RAA includes the LAA and all major watercourses contained within the Integrated Watershed Management Planning Units (as defined by Manitoba Water Stewardship) which the Project traverses (Map 9-3).

The administrative boundaries for aquatic resources pertain to the legislated protection of surface-water quality through federal and provincial legislation discussed in Section 9.3.1.1 and the following federal and provincial guidelines:

- Fisheries Protection Policy Statement (Fisheries and Oceans Canada 2013a).
- Measures to Avoid Causing Harm to Fish and Fish Habitat (Fisheries and Oceans Canada 2013b).
- Manitoba Water Quality Standards, Objectives, and Guidelines (MWS 2011).
- Water Quality Guidelines for the Protection of Aquatic Life (CCME 1999).
- Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat (Fisheries and Oceans and Manitoba Natural Resources 1996).
- Manitoba Forest Management Guidelines for Riparian Management Areas (Manitoba Conservation and Manitoba Water Stewardship 2008).
- Land Development Guidelines for the Protection of Aquatic Habitat (DFO 1993).

9.3.1.3 Identified Issues and Concerns

During the Key Person Interview process for the Project, concerns were raised regarding certain aquatic issues such as:

- Important streams and wetlands, wildlife and fish habitat: Red River Corridor/St. Adolphe PR 210 Bridge, Brokenhead Swamp, Rat River, Joubert Creek, Kirkpatrick Swamp and Roseau River.
- Flooding on local watercourses, including: Seine River, Manning Canal and Youville Drain.

The watercourses noted above have importance to the local residents.

During the Stakeholder Workshop at Mitchell, Manitoba, a representative of the Seine-Rat River Conservation District indicated that most of its conservation projects were located in the headwaters of those watercourses and were located away from the PDA. Additionally, comments regarding the potential for disturbance of habitat at stream crossings, a desire to select the alternative segment with the lowest number of stream crossings and the potential for negative effects on fish habitat were received during other engagement activities.

Table 9.3-1: Fish Species of Conservation Concern in the Project Description Area

Fish Species	Latin Name	Location	MESA	SARA	COSEWIC	MBCDC Rank*
Chestnut Lamprey (Saskatchewan-Nelson River Populations)	*Ichthyomyzon castaneus*	Red River, Rat River, Roseau River, Seine River	No status	'Special Concern' – Schedule 3	Data deficient (2010)	S3S4
Silver Chub (Red-Assiniboine Rivers – Lake Winnipeg Populations)	*Macrhybopsis storeriana*	Red River, LaSalle River, Rat River, Roseau River	No status	'Special Concern' – Schedule 1	Not at Risk	S3
Shortjaw Cisco	*Coregonus zenithicus*	Red River	No status	'Threatened' – Schedule 2	'Threatened'	No status
Lake Sturgeon (Red-Assiniboine Rivers – Lake Winnipeg Populations)	*Acipenser fulvescens*	Red River	No status	No status	'Endangered'	S2S3
Bigmouth Buffalo (Saskatchewan-Nelson River population)	*Ictiobus cyprinellus*	Red River, LaSalle River, Seine River**	No status	'Special Concern' – Schedule 1	'Special Concern'	S4
Bigmouth Shiner	*Notropis dorsalis*	Red River, Roseau River	No status	'Special Concern' – Schedule 3	Not at Risk (2003)	S3
Mapleleaf Mussel (Saskatchewan – Nelson Popoulation	*Quadrula quadrula*	Red River, Roseau River	Endangered	'Endangered" – Schedule 1	'Endangered' (2006)	S2
Calico Crayfish	*Orconectes immunis*	Unknown	No status	No status	No status	SNR

Note: all SARA and COSEWIC rankings current as of April 14, 2014 searches of the SARA Public Registry searches (http://www.registrelep-sararegistry.gc.ca)

***Manitoba Conservation Data Centre (MBCDC) – Subnational Ranks for Wildlife Species**

S1 – Very rare throughout its range or in the province (5 or fewer occurrences, or very few remaining individuals). May be especially vulnerable to extirpation.

S2 – Rare throughout its range or in the province (6 to 20 occurrences). May be vulnerable to extirpation.

S3 – Uncommon throughout its range or in the province (21 to 100 occurrences).

S4 – Widespread, abundant, and apparently secure throughout its range or in the province, with many occurrences, but the element is of long-term concern (> 100 occurrences).

S5 – Demonstrably widespread, abundant, and secure throughout its range or in the province, and essentially impossible to eradicate under present conditions.

B – Breeding status of a migratory species. Example: S1B, SZN - breeding occurrences for the species are ranked S1 (critically imperiled) in the province, nonbreeding occurrences are not ranked in the province.

N – Non-breeding status of a migratory species. Example: S1B, SZN - breeding occurrences for the species are ranked S1 (critically imperiled) in the province, nonbreeding occurrences are not ranked in the province.

**Historical occurrence

9.3.2 Project Interactions with Aquatic Resources

Table 9.3-2 lists Project activities and physical works and ranks their interactions with aquatic resources that potentially result in environmental effects.

Table 9.3-2: Potential Project Environmental Effects on Aquatic Resources

Project Activities and Physical Works	Potential Environmental Effect		
	Change in Surface-water Quality	Change in Distribution and Abundance of Fish SOCC	Change in Quantity and Quality of Fish Habitat
Construction:			
Clearing	1	1	1
Drilling	0	0	0
Marshalling Yards	0	0	0
Tower Installation	1	1	1
Stringing Conductors	0	0	0
Presence of Materials and Equipment	1	1	1
Site Reclamation	1	1	1
Operation and Maintenance:			
Project Presence	1	1	1
Maintenance of Infrastructure	1	1	1
Vegetation Management	1	1	1

KEY:

Project-related Environmental Effects were ranked as follows:

0 = No interaction.

1 = Interaction may occur; however, based on past experience and professional judgment, the resulting environmental effect is well understood and can be managed to acceptable levels through General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). No determination of significance of residual effects or cumulative effects assessment is warranted.

2 = Interaction may occur and the resulting environmental effect may exceed acceptable levels without implementation of project-specific mitigation.

9.3.2.1 Justification and Rationale for Interactions Ranked as 1

The interactions rated 1 are expected to have non-substantive interaction with aquatic resources or to be managed to acceptable levels through the planned implementation of well-established mitigation.

These interactions are anticipated to be localized within the PDA and LAA. Implementation of effective mitigation measures including the general environmental protection measures (Chapter 10) is expected to manage residual effects to acceptable standards. These interactions are rated as 1.

9.3.2.2 Selection of Key Indicators

Aquatic resources include streams, rivers, lakes and other bodies of freshwater that provide habitat for fish and other freshwater aquatic species. Aquatic resources have been divided into three aspects for consideration in this assessment: surface-water quality, fish SOCC, and fish habitat.

- Surface-water quality refers to the chemical, physical and biological characteristics of water that provide measures to which the condition of water relative to the requirements of one or more biotic species and/or any human need or purpose can be determined. The CCME and MWS maintain guidelines and objectives for the protection of aquatic life that provide a measurable basis for determining potential Project-related effects.
- Fish SOCCs are afforded protection under the federal *Species at Risk Act* (SARA 2002) and are categorized as Endangered, Threatened, or Species of Special Concern. Fish SOCCs have been identified as either occurring or having the potential to occur in watercourses potentially affected by Project-related activities and as such, have been identified as a receptor to potential changes in water-quality and changes in critical habitat.
- Critical Habitat is defined in the SARA (2002) as “habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species’ critical habitat in the recovery strategy or in an action plan for the species.” Currently, no fish SOCCs have recovery strategy documents or action plans in place. On this basis, fish habitat has been deemed to include “spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes” (*The Fisheries Act* 1985 [amended November 2013]).

9.3.2.3 Selection of Environmental Effects and Measurable Parameters

The potential environmental effects on aquatic resources associated with Project-related activities focused on the following:

- Changes in surface-water quality.

- Changes in distribution and abundance of fish SOCC.
- Changes in quantity and quality of fish habitat.

The selection of these environmental effects is based on the previously identified regulatory requirements (Section 9.3.1.1) in combination with the specific nature of Project activities that may interact in some measurable way with the aquatic environment.

Measureable parameters for potential environmental effects on aquatic resources are described in Table 9.3-3.

Table 9.3-3: Measurable Parameters for Aquatic Resources

Environmental Effect	Measurable Parameter	Rationale for Selection of Measurable Parameter
Change in surface-water quality	Total Suspended Solids (TSS), Dissolved Oxygen (DO) and pH concentrations	• TSS, DO and pH are numerical values providing a measure of the condition of water relative to the requirements of one or more biotic species and/or human need or purpose. • In general, these parameters can provide a reference against which compliance can be assessed. The most common standards used to assess water quality relate to health of ecosystems, safety of human contact and drinking water (e.g., CCME Water Quality Guidelines for Aquatic Life, Manitoba Water Quality Standards, Objectives, and Guidelines, etc.). • Provide a quantifiable baseline dataset to which comparisons may be made to determine any Project-related effects.
Change in distribution and abundance of fish SOCC		
Change in quantity and quality of fish habitat		

9.3.3 Residual Environmental Effects Description Criteria

Potential environmental effects of all Project-related activities on aquatic resources were ranked as 0 or 1 in Table 9.3-2; therefore, no residual environmental effects description criteria or significance thresholds are defined for this VC.

9.3.4 Existing Conditions for Aquatic Resources

9.3.4.1 Baseline Data Sources

A desktop study to characterize aquatic resources in the RAA was conducted using information gathered from publicly accessible sources including:

- Manitoba Conservation's Fish Inventory and Habitat Classification System

- Manitoba Conservation Database Centre (presence of listed species)
- Fisheries and Oceans Canada and Manitoba Water Stewardship (watershed and surface-water quality information)
- Conservation District information
- Manitoba Water Stewardship long-term water quality monitoring station data
- GIS and mapping
- Water Survey of Canada real-time hydrometric data
- Environment Canada historical surface-water quality monitoring data

Additionally, this information on surface-water features in the RAA was reviewed to identify information gaps. As tower footings are not anticipated to be located directly within surface waterbodies, no surface-water resource receptors within the pathways of tower footings during construction will be encountered. Tower footing locations will not be known until final design; therefore, fieldwork to confirm the conditions in the study area that was not part of the baseline study will occur. Site-specific information will be gathered during the design of the final tower locations.

9.3.4.2 Baseline Overview

This baseline considers the water quality of rivers and creeks over which both the La Verendrye to St. Vital Transmission Line (Y36V) and St. Vital to Letellier Transmission Line (V95L) will pass. Generally, surface-water quality in the RAA is affected by a combination of the water quality of seasonal runoff, local runoff and groundwater discharge, each of which are affected by soil, terrain, vegetation and human activities. Rural agricultural activities are the dominant land use in the RAA and existing water quality of watercourses are currently affected due to these activities. Point sources of contamination from other industrial activities have not been considered since these types of activities have been present in the study area for decades and the current water-quality baseline includes the influences of these activities. Available water quality information on watercourses that both the transmission lines will cross is presented in Appendix B.

Milani (2013) has classified almost all the watercourses located in southern agricultural Manitoba according to the fish habitat category that they provide. The assessment of potential environmental effects to surface water quality, fish habitat, and fish SOCC centred on watercourses that both transmission lines crossed in the PDA and LAA as fish habitat Type A, B, and C. Type A, B, and C fish habitat was selected as these types provide direct fish habitat and have the ability to support indicator or forage fish species. Sixteen watercourse crossings were identified as Type A, B or C. Specific information on watercourse crossing habitats and fish community compositions are provided in Appendix B.

Eight species at risk have been identified as historically or currently occurring in watercourses that the St. Vital to Letellier Transmission Line (V95L) and La Verendrye to St. Vital Transmission Line (Y36V) will cross or are tributaries to watercourses that the transmission lines will cross (Table 9.3-1).

9.3.5 Project Environmental Effects Assessment on Aquatic Resources

Potential environmental effects of all Project-related activities on aquatic resources were ranked as 0 or 1 in Table 9.3-2; therefore, no determination of significance of residual or cumulative environmental effects are conducted for this VC.

Project activities at stream crossings have the potential to affect fish SOCCs and fish habitat by causing changes in surface-water quality. Potential effects include

- Changes in surface-water quality through riparian vegetation loss/alteration leading to soil erosion, sedimentation, increased water yield, and loss of overhead cover at stream crossing locations (including temporary crossings for access trails/roads).
- Changes in fish SOCC stemming from changes in surface-water quality affecting aquatic food sources (e.g., primary producers, invertebrates and other lower trophic aquatic organisms) and feeding activities (e.g., suffocation from clogged/abraded fish gills, inability to locate prey due to reduced visibility, etc.).
- Changes in the quality or quantity of fish habitat at stream crossings from direct physical alteration of riparian habitats, stream-banks and streambed substrata and those stemming from changes in water-quality causing sediment deposition on spawning grounds.

Riparian vegetation is an important component of the aquatic environment as it provides ecosystem functions including erosion protection; filtering and retaining sediment; immobilizing, storing and transforming chemical inputs from uplands; maintaining stream-bank stability; modifying stream environments; providing water storage and recharge to subsurface aquifers and providing nutrients for aquatic organisms through the deposition of leaf litter and other organic matter (Schultz et al. 2004). These ecosystem functions are essential for sustaining a majority of fish species and maintaining functioning watersheds (Fitch et al. 2003; Agriculture and Agri-Food Canada 2004). Project construction activities including clearing and site reclamation may result in the loss of riparian and aquatic vegetation. This loss of riparian vegetation has the potential to increase water temperatures due to loss of canopy plant species, increase the potential for detrimental plant growth (e.g., algal blooms) due to increased light exposure, and decrease amount of cover available to fish through the loss of over-hanging vegetation. Additionally, reducing the buffering capacity in agricultural land-use areas through the removal of riparian vegetation may also lead to increased concentrations of agricultural by-products (agro-chemicals and wastes), potentially affecting surface-water quality (Knutson and Naef 1997).

Should the need to ford existing streams or install temporary stream crossings (e.g., culverts) occur during tower installations, soil compaction and increased erosion and sediment transport in watercourses may occur, especially during rain and heavy runoff events during the construction and operation and maintenance phases. This may cause detrimental changes in TSS, DO and pH concentrations, increased siltation and soil erosion depositions, and sedimentation over streambed substrata. Temporary sediment mobilization associated with Project construction will likely be of short duration, within the magnitude currently associated with agricultural activities, and therefore may not be easily distinguishable from background levels.

Noise and vibration from activities in and near watercourses may cause fish to move from the area, altering fish abundance and distribution. These effects would be confined to temporary stream crossing locations within the LAA, and would likely be of short duration, as fish would be expected to return to the area within hours or days after activity has ceased.

Modifications during construction to the existing St. Vital, La Verendrye and Letellier stations will occur within the existing fenced station sites. As such, Project-related effects on aquatic resources are not expected. Additionally, no effects are expected during the operations and maintenance phases of the Project as these stations will continue to operate as they currently do.

9.3.5.1 Mitigation

Adherence to Fisheries and Oceans Canada’s Fisheries Protection Policy Statement (Fisheries and Oceans Canada 2013a) through the use of Measures to Avoid Causing Harm to Fish and Fish Habitat (Fisheries and Oceans Canada 2013b) during the construction and maintenance and operation phases of the Project are anticipated to minimize the effects to surface-water quality and avoid causing serious harm to fish.

Designing and installing stream crossings using procedures outlined in the “Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat” (Fisheries and Oceans Canada and MNR 1996) and Fisheries and Oceans Canada’s “Fisheries Protection Policy Statement” (2013a) will minimize potential adverse effects resulting from sediment mobilization. Implementation of properly designed and maintained sediment- and erosion-control measures will aid in minimizing potential adverse environmental effects to Aquatic Resources.

General mitigation measures (see Chapter 10) to be implemented during Project construction will be outlined in the Project Environmental Protection Plan and will include: sediment and erosion control structures; limiting vehicular traffic to existing or newly constructed roads and approved trails; maintenance and repair of any stream crossings; controlled application of road dust inhibitors; and establishment of appropriate setback buffers from existing waterbodies and streams, where practical. Implementation of these and other beneficial management practices will reduce potential Project-related adverse environmental effects on surface water quality, fish SOCCs and fish habitat. Monitoring, including pre-construction and post-construction surface-water sampling, if in-stream work is required, (outlined in the Project Environmental Protection Plan) will be used to verify mitigation measures are sufficient to comply with applicable standards, guidelines or objectives.

Alternative route alignments were considered during the early design phases of the Project. As previously identified, the EA process (Section 4.1) which was consistent with provincial and federal environmental assessment legislation, guidelines and procedures, used a broad range of engineering, environmental, socio-economic and stakeholder information to compare route alternatives and identify a preferred route.

Transmission line routing plays a role in mitigation by attempting to minimize the overall effects of the project (details provided in Chapter 8). Watercourses classified as Type A, B and C fish habitat (as defined by Milani [2013]) and riparian habitat were criteria in the routing process which was weighted against other criteria attempting to minimize overall effects.

Application of proven and effective mitigation measures will be implemented as part of the Project to avoid or minimize the environmental effects on aquatic resources. Project specific mitigation measures with respect to aquatic resources will be outlined in detail in the environmental protection plan and environmental response plan including, but not limited to, implementation of:

- An effective sediment and erosion control plan identifying practices such as silt fences, filter berms, and erosion control blankets as appropriate.
- Proper storage and use of hazardous materials in proximity to watercourses.
- A surface-water quality monitoring plan to identify Project-related increases in TSS, DO and pH concentrations in waterways, if in-stream work is required.
- The removal of any construction debris or other materials that may potentially affect fish SOCCs and fish habitat.
- Waste-materials storage above the ordinary high water mark prior to removal, to prevent them from entering watercourses.
- Shoreline vegetation retention to the greatest extent possible in order to maximize bank stability.
- Shoreline vegetation stabilization the following spring by covering exposed areas with erosion control blankets to keep soil in place and prevent erosion if insufficient time in the growing season remains.
- Appropriate precautions so that potentially deleterious substances (such as fuel, hydraulic fluids, oil, sediment, etc.) will not enter watercourses if in-stream work is required.
- Fuel storage and equipment servicing areas located a minimum of 100 m away from the ordinary high water mark of any watercourse (any fuel storage areas will be required to be

operated according to the *Storage and Handling of Petroleum Products and Allied Products Regulation* [M.R. 188/2001]).

- Machinery operation from outside the water in a manner that minimizes disturbance to the watercourse shorelines and riparian vegetation.
- Machinery arrival on-site in a clean condition and maintained free of fluid leaks.
- Machinery servicing, refueling and fuel storage away from watercourses to prevent deleterious substances from entering watercourses (any fuel spills that occur will be reported to Manitoba Conservation and Water Stewardship in accordance with the *Environmental Accident Reporting Regulation* [M.R. 439/87]).
- An emergency spill kit on-site in case of fluid leaks or spills from machinery.
- Effective sediment and erosion control measures prior to work starting in order to prevent the entry of sediment into watercourses.
- Maintenance of sediment and erosion control measures maintenance until complete re-vegetation of disturbed areas is achieved.
- Appropriate construction timing windows should there be a need for in water or shoreline work (i.e., no in water or shoreline works will occur between **April 1 and June 15** of any given year).
- Minimized disturbance to the bed and banks of the watercourses to the extent possible.

9.3.5.2 Summary of Project Residual Environmental Effects on Aquatic Resources

The implementation of the beneficial management practices, provincial guidelines for stream crossings, protection principles in the federal Fisheries Protection Policy Statement (Fisheries and Oceans Canada 2013a), and the Project Environmental Protection Plan will result in residual Project effects on aquatic resources meeting acceptable levels. The effects will be short-term, occurring only during the construction phase of the Project and will likely be restricted to areas where stream crossings are necessary.

9.3.6 Cumulative Effects on Aquatic Resources

The Project residual environmental effects on aquatic resources are expected to be minimal, given the limited potential for and short duration of project-aquatic environment interactions. Other projects or activities that may affect aquatic resources in the same area and time frame as those of the Project are primarily agricultural related (e.g., surface water contamination from herbicide and pesticide application activities, decreased surface water quality from surface runoff). The Project’s contribution to cumulative effects is not expected to be discernible above baseline conditions.

9.3.7 Follow-up and Monitoring

While adverse effects are considered mitigable to the point as to be undiscernible from baseline conditions, continued monitoring of sedimentation and erosion control structures, and visual site inspections in the LAA during construction will be carried out to confirm that mitigation measures are effective.

9.3.8 Summary

Construction of the Project will result in minimal effects on surface water quality, fish SOCC and fish habitat during the construction period. During Project operations, little or no effect on surface water quality, fish SOCC and fish habitat is anticipated.

9.4 NATURAL VEGETATION

9.4.1 Scope of Assessment for Natural Vegetation

The Project has the potential to interact with natural vegetation by altering terrestrial habitats, such as native prairie and wetlands and/or populations of vascular plants that are important in a socio-economic or environmental context. These vascular plants may include Species of Conservation Concern (SOCC), including Species at Risk (SAR).

Natural vegetation was selected as a VC because rare, fragile and/or important ecosystems may be present in the Project area. Greater than 99% of the native tall-grass prairie at its northern extent in Manitoba has disappeared due to land cultivation, over-grazing by cattle, installation of ditches and urbanization. Many of the rare and listed plant species in the province occur in remnant prairies and pastures in southern Manitoba. Although grazed pastures may not be defined in the same way as native prairie, they still have the potential to provide good quality habitat for rare plant species (Koper et al. 2009). Native prairies and SOCC provide important habitat for wildlife and are important for local residents for their intrinsic values. Wetlands and wetland vegetation provide ecological services such as cleaning of water and flood/drought mitigation. Wetlands and river crossings are also important to waterfowl, fish, and aquatic invertebrates.

Natural vegetation represents a number of plant species that make up rare, unique or ecologically important habitat and provides wildlife habitat, including habitat for birds, mammals, fish, herptiles and invertebrates. Native and non-native grasslands are important to many species of wildlife. Grassland songbirds use open areas of prairie and pasture as breeding habitat, while migrating waterfowl use prairies for foraging. As grassland songbirds are among the guild of birds with the fastest recorded declines in North America (Herkert et al. 2003), protection of their habitat is important. Mammals, herptiles and invertebrates also use grasslands for residences and foraging. Wetlands and wetland vegetation provide habitat for waterfowl, shorebirds, mammals, fish, amphibians and reptiles. Changes in biodiversity of the natural vegetation and plant communities may have effects on the wildlife species that depend on it.

9.4.1.1 Regulatory Setting

The assessment of potential environmental effects of the Project on natural vegetation includes considering federally and provincially listed plant species and plant communities. Plant species at risk are listed under the federal *Species at Risk Act* (2002; SARA) and the *Manitoba Endangered Species Act* (1998; MESA). Wetlands conservation is promoted under the *Federal Policy on Wetland Conservation* (1991), while wetland vegetation and riparian areas are protected under the *Manitoba Planning Act* (2011) and the City of Winnipeg Charter (2002–revised 2012) for lands inside the city of Winnipeg. Although there is no specific federal legislation for wetlands and wetland vegetation, they may be protected under the SARA if they provide critical habitat for a plant or animal species at risk.

While no specific regulatory requirements exist for species assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (but not listed federally or in Manitoba), or for plant species provincially ranked as very rare (S1) or rare (S2), the same guidelines that are used for listed species will be employed where possible. As the province of Manitoba does not have specific guidelines for plant SOCC, the federal guidelines outlined in the Canadian Wildlife Service document, *Activity Set-back Distance Guidelines for Prairie Plant Species at Risk* (2011) will be followed. The Manitoba *Noxious Weeds Act* (2010) should be followed to minimize effects from the spread of invasive plant species. For wetlands, the Federal Policy on Wetland Conservation (1991), the Manitoba Planning Act, Manitoba Land use policies, the City of Winnipeg Charter and Vision Winnipeg 2020 will be used in this assessment.

9.4.1.2 Boundaries

The temporal boundaries for environmental effects assessment of the Project on natural vegetation includes construction, operation and maintenance phases of the project; see Section 3.7 for the Project construction schedule. Operation and maintenance, which includes a vegetation management program, will continue until project decommissioning.

The spatial boundaries for the environmental effects assessment of natural vegetation are as follows:

Project Development Areas (PDA): The area within which all construction activities take place. The PDA includes 119 km of transmission line between St. Vital Station and Letellier Station, and 37 km of transmission line between St. Vital Station and La Verendrye Station, and upgrades at the station sites (Map 9-4). For the purposes of this assessment, a 40 m ROW was used.

Local Assessment Areas (LAA): The LAA for natural vegetation has the same boundaries as the PDA for natural vegetation (Map 9-4).

Regional Assessment Area (RAA): The RAA for natural vegetation includes a 10 km-wide corridor (5 km on either side of the ROW centre-line) encompassing the PDA (Map 9-4). This is the area within which cumulative effects to natural vegetation will be evaluated.

The administrative boundaries for changes to natural vegetation pertain to the legislated protection of native grasslands and other natural areas through federal and provincial legislation discussed in Section 9.3.1.1, includingthe following federal and provincial guidelines:

- Federal Activity Set-back Distance Guidelines for Prairie Plant Species at Risk
- Provincial Planning Regulation (MR 81/2011)
- City of Winnipeg Charter/Winnipeg 2020 Vision
- Federal Policy on Wetland Conservation

The City of Winnipeg Charter section on zoning bylaws for development (Sub-section 236(2)) stipulates that a zoning bylaw may provide for the protection of scenic areas and sensitive lands. Sensitive lands include lands that provide wildlife habitat and wetlands. The associated policy document, Winnipeg 2020 Vision states, "*The City shall protect environmentally-sensitive lands that contain important pockets of natural flora and fauna or that are susceptible to damage from flooding or erosion by: i) evaluating proposed developments that affect high-quality natural areas and encouraging the protection and preservation of such lands to the greatest extent possible; ii) developing a lands plan which designates natural areas that are environmentally-sensitive and/or significant and provides measures for the possible acquisition, preservation, protection, and maintenance of such lands; iii) protecting flood plains and unstable riverbank slopes by identifying susceptible areas and employing protective and preventive measures, including the possible acquisition of such lands, to reduce the risk of property damage where appropriate; and iv) encouraging private landowner participation in support of riverbank management*."

9.4.1.3 Identified Issues and Concerns

Effects to natural vegetation were noted as a concern during the public engagement process. Open house participants expressed concern about the spread of noxious weeds in agricultural areas. Residents highlighted the importance of following the Manitoba *Noxious Weeds Act* (2010).

Comments regarding avoidance of wetlands and forested areas where possible, preservation of shelterbelts and some concern regarding the use of herbicides for vegetation management were also received during engagement activities (Chapter 7). Suggested mitigation strategies included site reclamation with native species.

9.4.2 Project Interactions with Natural Vegetation

Table 9.4-1 ranks the potential of an environmental effect on natural vegetation to result from interactions between the environment and Project activities. Further assessment of residual environmental effects is based on the rating value assigned in Table 9.4-1.

Table 9.4-1: Potential Project Environmental Effects on Natural Vegetation

Potential Effects	Change in SOCC or their Habitat	Spread of Invasive or Non-native Plants	Change in Native Vegetation Distribution	Loss of Wetland Vegetation
Construction:				
Clearing	2	2	2	2
Drilling	0	0	0	0
Marshalling Yards	0	1	1	1
Tower Installation	0	1	1	0
Stringing Conductors	0	1	1	0
Presence of Materials and Equipment	0	1	1	1
Site Reclamation	1	1	1	1
Operation and Maintenance:				
Project Presence	0	1	0	0
Maintenance of Infrastructure	1	2	0	0
Vegetation Management	1	2	1	1

KEY:

Project-related Environmental Effects were ranked as follows:

0 =No interaction.

1 = Interaction may occur; however, based on past experience and professional judgment, the resulting environmental effect is well understood and can be managed to acceptable levels through General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). No determination of significance of residual effects or cumulative effects assessment is warranted.

2 = Interaction may occur and the resulting environmental effect may exceed acceptable levels without implementation of project-specific mitigation.

9.4.2.1 Justification and Rationale for Interactions Ranked as 1

The effects of interactions rated 1 are expected to have non-substantive interaction with natural vegetation or to be managed to acceptable levels through the planned implementation of well-established mitigation. The rationale for ranking interactions as 1 is discussed below. Assessment of interactions ranked 2 occur in Section 9.4.5.

The presence of materials and equipment and marshaling yards have been ranked as a 1 for spread of non-native/invasive plants, changes to vegetation distribution and loss of wetland vegetation. Soil compaction that results from the presence of the equipment may affect natural vegetation through direct mortality of native plants, which may allow for the colonization of non-native/invasive species.

Tower installation and stringing conductors have been ranked as 1 for changing vegetation distribution and for the spread of non-native/invasive plant species. Increased vehicle traffic, the associated soil compaction and the potential soil contamination from spills/debris may cause direct mortality of natural vegetation, allowing for the colonization of non-native/invasive plant species and changes in vegetation distribution.

Project Activities and physical works associated with operation and maintenance including project presence, maintenance of infrastructure and vegetation management will potentially interact with natural vegetation. The presence of the Project has been ranked as 1 for the spread of non-native/invasive plants. Presence of the ROW for the project creates edge habitat, which may promote the spread of non-native and invasive plant species.

Vegetation management, which may include mowing, cutting and/or use of herbicides, has been ranked as a 1 for effects to SOCC, changes to vegetation distribution and loss of wetland vegetation. Vegetation maintenance along the ROW may act as a barrier for the spread of native prairie plants from one side of the ROW to the other. Frequent mowing and cutting may affect slower growing native prairie species (including SOCC), and allow for the establishment of fast-growing non-native/invasive plant species. Less frequent mowing may allow for the establishment of sustainable populations of native and SOCC plants along the ROW (Leston 2013).

Use of herbicides may also allow for fast-growing invasive plants to outcompete native plants.

9.4.2.2 Selection of Environmental Effects and Measureable Parameters

The environmental assessment of natural vegetation is focused on the following environmental effects:

- Changes to SOCC and their habitats
- Spread of invasive or non-native plants
- Change in native vegetation distribution
- Loss of wetland vegetation

The Project has the potential to impact natural vegetation through disturbance of plant habitat leading to degradation in habitat quality. Reduction in habitat quality may involve non-native and invasive species outcompeting native species, which in turn may change the distribution and abundance of natural vegetation. The potential changes may cause loss of other terrestrial populations that use areas of natural vegetation or wetland/riparian areas as habitat.

Table 9.4-2 provides the measurable parameters used for the assessment of the selected environmental effects.

Table 9.4-2: Measurable Parameters for Natural Vegetation

Potential Effects	Key Indicators	Measurable Parameters
Change in SOCC or their habitat	Many plant SOCC (e.g., Western prairie fringed orchid, Small white lady's slipper, Western silvery aster, etc.).	Loss of populations of plant SOCC. Loss or effects to populations or critical habitat of plant Species at Risk (SAR).
Spread of invasive or non-native plants	Invasive and non-native plant species.	Number of occurrences or area of invasive and non-native plant species.
Change in native vegetation distribution	Vegetation distribution.	Area of vegetation communities altered.
Loss of wetland vegetation	Wetland altered.	Area of wetland altered.

9.4.3 Residual Environmental Effects Description Criteria

Criteria for evaluating residual environmental effects of the Project on natural vegetation are used to assess loss or change in natural vegetation, including SOCC. Definitions for the effects are as follows:

- For quantitative factors, the geographic area that will be impacted.
- For qualitative factors, the criteria used to assess residual environmental effects are described in Table 9.4-3.

Table 9.4-3: Characterization of Residual Environmental Effects for Natural Vegetation

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	Changes in SOCC populations and distribution	**Positive** – an increase in natural vegetation, SOCC or their habitat, wetland vegetation or a reduction in invasive or non-native plant spread within the RAA.
		Adverse – a decrease in natural vegetation, SOCC or their habitat, wetland vegetation or an increase in invasive or non-native plant spread within the RAA
		Neutral – no net change in natural vegetation, SOCC, wetland vegetation or invasive or non-native plant spread within the RAA
Magnitude	Area of habitat altered, or losses/gains to plant populations and distribution	**Negligible** – no measurable change in SOCC/non-native/invasive/wetland plant populations and distribution
		Low – a very small/localized change to SOCC/non-native/invasive/wetland plant populations and distribution
		Moderate – a measurable, but not substantive change to SOCC/non-native/invasive/wetland plant populations and distribution
		High – a measurable and substantive change SOCC/non-native/invasive/wetland plant populations and distribution
Geographical Extent	Effects are considered for both the PDA/LAA and the RAA	**PDA/LAA** – effects to natural vegetation are restricted to the PDA/LAA
		RAA – effects to natural vegetation extend into the RAA
Timing and Frequency	Effect to natural vegetation may occur from construction activities and/or project operation	**Single event** – various construction activities will only occur during construction phase
		Infrequent – effects considered to likely occur a few times per year
		Frequent – effects considered to likely occur more than a few time per year

Table 9.4-3: Characterization of Residual Environmental Effects for Natural Vegetation

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		Continuous – effects considered to occur for the life of the project (construction through decommissioning).
Duration	Length of time for natural vegetation to revert to pre-project conditions	**Short-term** – effects to natural vegetation restricted to construction phase
		Medium-term – effects to natural vegetation continues through operational phase
		Long-term – effects to natural vegetation continue past project decommissioning
		Permanent – effects to natural vegetation are permanent
Reversibility	Likelihood that plant populations and/or distribution will recover from project construction and operation	**Reversible** – natural vegetation will recover after project decommissioning
		Irreversible – effects to natural vegetation are permanent
Ecological and Socio-economic Context	The Project is located predominantly on agricultural land, with some pasture	**Low-disturbance** – land supports large, intact areas of natural vegetation
		Moderate-disturbance – land has been modified for agriculture and/or human development yet supports some large areas of natural vegetation
		High-disturbance – land has been highly modified for agriculture and/or other human development; much of the original natural vegetation has been converted to other land uses
Likelihood of Significant Effect	The likelihood that plant populations and distribution will be significantly affected	**Low** – a low likelihood that there will be significant effects on SAR/SOCC/non-native/invasive/wetland plant populations and distribution
		Medium – a medium likelihood that there will be significant effects on SOCC/non-native/invasive plant/wetland populations and distribution

Table 9.4-3: Characterization of Residual Environmental Effects for Natural Vegetation

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		High – a high likelihood that there will be significant effects on SOCC/non-native/invasive/wetland plant populations and distribution

9.4.3.1 Significance Thresholds for Residual Environmental Effects

Residual effects rating criteria for potential environmental effect of the Project on natural vegetation are considered significant if they result in any of the following:

- For secure species – an effect that causes changes in abundance and distribution of a species such that its population would no longer be secure in the RAA.
- For Endangered or Threatened SAR (under SARA or MESA) – an effect that contravenes any of the prohibitions listed by SARA or MESA.
- For other SOCC – an effect that changes the terrestrial habitat or results in direct mortality of individuals or communities in such a way as to substantially reduce the likelihood of long-term survival of populations within the RAA.
- For wetlands and riparian vegetation – an effect that results in a non-compensated net loss of wetland area and function.

9.4.4 Existing Conditions for Natural Vegetation

9.4.4.1 Baseline Data Sources

The description and assessment for natural vegetation focused on the presence of rare plants and rare plant communities, wetlands and river crossings. Data sources used for the desktop and field assessments included:

- Canadian Land Cover Classification (LCC).
- Aerial photographs.
- Nature Conservancy of Canada (NCC) – land ranking data.
- Wetland classification.
- MBCDC data on rare plant observations.
- SAR/SOCC lists from SARA, MESA and Manitoba Conservation.

- Reports on occurrence of tall-grass prairie communities discovered during tall grass prairie inventories completed in the late 1980s, 1990s and 2007-2008.

A field program conducted in the St. Vital to Letellier (V95L) route area included general reconnaissance of grasslands in the area to assess potential for SOCC. Characterization of riparian/wetland habitat was also conducted at waterbodies along with roadside surveys to assess areas of conservation priority as ranked by the NCC.

9.4.4.2 Baseline Overview

9.4.4.2.1 Land Cover

Land cover and aerial photographs were reviewed to assess whether areas within the PDA could support populations of SOCC and if the Project crossed any water bodies. The federal LCC for the St. Vital to Letellier transmission line (V95L) shows that the majority of land within the PDA has already been altered from its natural state. Annual or perennial cropland makes up 67%, while developed/exposed land makes up 23%. Natural vegetation occurrences in the PDA/LAA are low, with only 8% characterized as grassland/herb/tall shrub and 1.3% as forest. Of the grassland/herb habitat type, much of this occurs as grazed pasture, while some may be hayed land. Both of these habitat types have both native and non-native plant species. Water/wetlands make up 0.2% of the land cover.

Similarly for La Verendryre to St. Vital (Y36V) line, most of the land has been converted to lower-quality habitat types. Annual and perennial cropland make up 71% of the land use, while 3% is developed land within the PDA/LAA. Grassland/herb cover types make up 24%, while forested areas account for 2% of land within the PDA/LAA. Most of the grassland/herb cover type is along the Red River Floodway, which is previously altered and seasonally disturbed grassland of marginal quality (Manitoba Floodway Expansion Authority 2004). Water/wetlands make up 0.5% of the PDA/LAA.

9.4.4.2.2 Grasslands

The grasslands visited during the general reconnaissance field surveys were of marginal quality (i.e., not native prairie), and would not likely provide good habitat for plant SOCC. Surveys of native tall grass prairie in the area in the late 1980s (Joyce and Morgan), 1995 (Mansel) and revisits to these sites in 2006-2008 (Koper et al.), revealed that very little of the original native tall-grass prairie remains, while the remaining native prairie continues to be degraded over time. A GIS-based desktop analysis of prairies identified in the 1980s and 1990s determined that none of these prairies would be traversed by the Project.

Although there is potential for SOCC to occur in other grasslands such as pasture or hayed lands, the invasive and non-native plant species in these habitat types tend to displace native plants (Koper et al. 2009), resulting in a low likelihood of SOCC occurrence in the LAA. The MBCDC does not have any recorded observations of rare or listed plant species within the LAA.

No “sensitive lands” as defined by the *Manitoba Planning Act* or the City of Winnipeg Charter were identified in the LAA.

9.4.4.2.3 Wetlands

Water and wetland areas make up a very small percentage of landcover within the LAA. Numerous waterbodies will be crossed by the Project as outlined in Table 9.4-4. Most of the waterbodies are bordered by disturbed grassland and agriculture. Some of the larger waterbodies such as the Seine, Rat, La Salle and Red rivers exhibit areas bordered by riparian forests.

Table 9.4-4: Waterbody Crossings in the Study Area

Proposed Line	River/Stream/Wetland Crossing	Vegetation Attributes*
V95L/Y36V	Navin Drain near (St. Vital Station)	Bordered by disturbed grassland
V95L/Y36V	Red River Floodway (south of City of Winnipeg)	Bordered by disturbed grassland
V95L/Y36V	Old Prairie Grove Drain	Bordered by disturbed grassland
V95L	Seine River (near Grande Pointe)	Bordered by agriculture and riparian forest characterized as broadleaf dense
V95L	Seine River Diversion (near Ile des Chenes)	Bordered by disturbed grassland
V95L	Prefontain Drain (near Niverville)	Bordered by disturbed grassland/agriculture
V95L	Joubert Creek (near St. Jean Baptiste)	Bordered by riparian forest characterized as broadleaf dense
V95L	Rat River (near Grunthal)	Bordered by homestead and some small riparian forest patches characterized as broadleaf dense
V95L	Roseau River (near Dominion City)	Bordered by riparian forest characterized as broadleaf open
V95L	Red River (near Letellier Station)	Bordered by herbaceous/shrubby vegetation and agriculture
Y36V	Red River (near St. Norbert)	Bordered by disturbed grassland
Y36V	La Salle River (near St. Norbert)	Bordered by riparian forest characterized as broadleaf dense
Y36V	Four unnamed drains (south of Oak Bluff)	Bordered by disturbed grassland/agriculture

*Vegetation attributes derived from LCC, orthophotos and field site visits

9.4.4.2.4 Forested Areas

A very small percentage of the land within the study area is forested. Much of the forested area within the LAA occurs along rivers/streams or in small wooded patches. Forests types are mainly dense or open broadleaf with grassy/herbaceous understories.

9.4.5 Project Environmental Effects Assessment on Natural Vegetation

The assessment of Project-related environmental effects considered only the interactions ranked 2 in Table 9.4-1. The following sections provide the environmental effects assessment and prediction of residual environmental effects on natural vegetation resulting from interactions ranked 2.

9.4.5.1 Analytical Methods

The federal LCC, ortho-photography and land conservation rankings provided by the NCC were used to assess habitat, while data on rare species occurrences in the study area were obtained from the MBCDC. A desktop assessment was conducted to assess if lands within the study area had the potential to provide habitat for SOCC. A general reconnaissance survey was conducted in the study area. Lands that were assigned a high conservation ranking (as per the NCC) were visited to assess their potential to provide habitat for SOCC. Wetlands and stream crossings were also visited to assess riparian vegetation.

9.4.5.2 Assessment of Changes in Natural Vegetation

9.4.5.2.1 Construction

Clearing during the construction phase of the project has been ranked as 2 for all potential effects to natural vegetation. Clearing within the ROW will remove all treed vegetation, contributing to potential direct mortality for SOCC that occur in the area. Clearing also creates soil disturbance, which can lead to colonization by invasive/non-native weedy species that can outcompete native plant species and cause changes in vegetation distribution. Clearing near stream/river crossings may also cause loss of wetland vegetation.

Modifications to the existing St. Vital, La Verendrye and Letellier stations will occur within the fenced station sites. As such, there are no Project-related effects on natural vegetation expected to occur.

9.4.5.2.2 Operation

Vegetation management has been ranked as 2 for the spread of non-native/invasive plants. Vegetation maintenance along the ROW may act as a barrier for the spread of native prairie plants from one side of the ROW to the other. Frequent mowing and cutting may affect slower growing native prairie species (including SOCC), and allow for the establishment of fast-growing non-native/invasive plant species. Less frequent mowing may allow for the establishment of sustainable populations of native and SOCC plants along the ROW (Leston 2013).

Use of herbicides may also allow for fast-growing invasive plants to outcompete native plants. Herbicides may get into adjacent ditches and wetlands, which could cause direct mortality and loss of wetland vegetation.

The St. Vital, Letellier and La Verendrye stations will continue to operate as they currently do during the operations and maintenance phases of the Project, therefore operations-related Project effects on natural vegetation are not expected to occur.

9.4.5.2.3 Mitigation

Mitigation measures to minimize effect of the Project on vegetation SOCC, the invasion of non-native weedy species, change in natural vegetation and loss of wetlands include the following:

- Adherence to the activity setback guidelines for prairie plant SOCC outlined in Chapter 10.
- Soil disturbance will be limited by retaining vegetation adjacent to and between worksite locations.
- If clearing coincides with wildlife breeding periods, a qualified biologist will conduct pre-clearing surveys prior to clearing to identify any hollow-bearing trees which may be used by native fauna in the area. These trees will be left standing wherever possible.

9.4.5.3 Summary of Project Residual Environmental Effects on Natural Vegetation

Table 9.4-5 summarizes the residual effects assessment of the Project on natural vegetation. During the construction phase of the Project, residual effects will include potential destruction of vegetation SOCC populations, spread of non-native/invasive species, changes to vegetation distribution and loss of wetland plants. During the operational phase of the Project, infrastructure management and vegetation management will have residual effects on the spread of non-native and invasive plant species.

The implementation of standard operating procedures and beneficial management or codified practices will mitigate many of the Project environmental effects on natural vegetation. Residual effects are discussed in more detail in the following section on the determination of their significance.

9.4.5.4 Determination of Significance of Residual Environmental Effects

9.4.5.4.1 Change in SOCC or their Habitat

During construction, clearing activities may result in a direct loss of vegetation SAR or SOCC or their habitat. Land within the PDA will be disturbed by vegetation removal and soil disturbance as surfaces are prepared for drilling and tower installation. The Project is situated within a highly disturbed environment where land has been modified for agriculture and much of the original natural vegetation been converted to other land uses. Construction activities may result in the loss of some habitat types that are already limited in availability in the Project assessment areas. The effect of clearing activities on SAR or SOCC or their habitat is characterized as being adverse, low in magnitude and restricted to the PDA and LAA. The effect will occur once during construction and be irreversible. The residual effects are not expected to reduce the likelihood of long-term survival of populations within the RAA and the Project effects on SOCC and their habitat is assessed as being not significant.

9.4.5.4.2 Spread of Invasive or Non-native Plants

During construction and operation, Project activities may cause an increase in the spread of invasive or non-native plants. The effect of clearing activities on the spread of invasive or non-native plants is characterized as being adverse, moderate in magnitude during construction but low during operations, restricted to the PDA/LAA and reversible. The residual effects of the spread of invasive and non-native plants are not expected to cause changes in abundance and distribution of a plant species such that its population would no longer be secure in the RAA. The effect of the Project on the spread of invasive and non-native plants is assessed as being not significant.

9.4.5.4.3 Change in Vegetation Distribution

During construction, clearing and associated soil disturbance activities will cause a change to vegetation distribution. The effect of construction activities on changes to vegetation distribution is characterized as being adverse, low in magnitude, restricted to the PDA/LAA and reversible. The Project effects are not expected to cause changes in abundance and distribution of a plant species such that its population would no longer be secure in the RAA. The effect of the Project on vegetation distribution is assessed as being not significant.

Table 9.4-5: Summary of Residual Project Effects on Natural Vegetation

Potential Residual Environmental Effects for the Project	Proposed Mitigation	Residual Environmental Effects Characteristics								Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Ecological Context	Significance	Likelihood of Significant Effect	
Change in SOCC and Their Habitat										
Construction - Clearing	• Compliance with prairie plant SAR/SOCC activity setback guidelines.	A	L	L	ST/S	I	HD	N	N/A	Pre-clearing surveys in areas identified as having potential to provide habitat for SAR/SOCC.
Change in Spread of Invasive or Non-native Plants										
Construction - Clearing	• Use of appropriate timing windows to minimize introduction of invasive plants. • Stabilize disturbed soils as soon as practicable by seeding with native/non-invasive plants, using hay or mulch to reduce weeds. • Do not bring in soil from other sites with known populations of invasive plant species. • Proper cleaning of equipment to reduce risk of transporting/spreading invasive plants.	A	M	L	ST/F	R	HD	N	N/A	Monitoring for invasive species and managing as per the *Noxious Weeds Act*. General monitoring that EnvPP is being implemented appropriately

Table 9.4-5: Summary of Residual Project Effects on Natural Vegetation

Potential Residual Environmental Effects for the Project	Proposed Mitigation	Residual Environmental Effects Characteristics								Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Ecological Context	Significance	Likelihood of Significant Effect	
	• Proper disposal of cleared invasive plants, which may include burning, burying or drying. • Early detection of populations of invasive plants and rapid response to mitigation measures. • Use of appropriate general mitigation (Chapter 10) to minimize soil disturbance.									
Operation and Maintenance - Maintenance of Infrastructure, Vegetation Management	• Selective herbicide spraying for invasive plants, as per Manitoba Hydro Vegetation Management practices • Proper cleaning of equipment to reduce risk of transporting/spreading invasive plants.	A	L	L	MT/C	R	HD	N	N/A	Monitoring for invasive species and managing as per the *Noxious Weeds Act*.

Table 9.4-5: Summary of Residual Project Effects on Natural Vegetation

Potential Residual Environmental Effects for the Project	Proposed Mitigation	Residual Environmental Effects Characteristics								Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Ecological Context	Significance	Likelihood of Significant Effect	
Change in Natural Vegetation Distribution										
Construction - Clearing	• Limit soil disturbance by retaining vegetation adjacent to and between worksite locations	A	L	L	ST/S	R	HD	N	N/A	Monitoring for invasive species and managing as per the *Noxious Weeds Act*.
Operation and Maintenance - Vegetation Management	• Selective herbicide spraying for invasive plants, as per Manitoba Hydro Vegetation Management practices	A	L	L	MT/C	R	HD	N	N/A	
Loss of Wetland Vegetation										
Construction - Clearing	• Utilize low impact clearing techniques for riparian trees to minimize soil disturbance • Implement appropriate buffer zones around wetlands • Use erosion control methods in uplands • Sedimentation abatement near wetlands, specifically when working in small drainages and feeder creeks • Utilize appropriate construction timing windows to minimize effects to wetland vegetation	A	L	L	ST	I	H	N	N/A	

Table 9.4-5: Summary of Residual Project Effects on Natural Vegetation

Potential Residual Environmental Effects for the Project	Proposed Mitigation	Residual Environmental Effects Characteristics								Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Ecological Context	Significance	Likelihood of Significant Effect	

KEY (Refer to Table 9.4-3 for definitions on the terms referenced below):

Direction: P: Positive; A: Adverse; N: Neutral

Magnitude: N: Negligible; L: Low; M: Moderate; H: High

Geographic Extent: L: Local- within the PDA/LAA; R: Regional - within the RAA

Duration: ST: Short-term; MT: Medium-term; LT: Long-term; P: Permanent – will not change back to original condition

Frequency: S: Single Event; I: Infrequent; F: Frequent; C: Continuous.

Reversibility: R: Reversible; I: Irreversible.

Ecological/Socio-economic Context: LD: Low disturbance; MD: moderate disturbance; HD: High-disturbance

Significance: S: Significant; N: Not Significant.

Likelihood of Significant Effect: Based on literature review and professional judgment. N/A: Not Applicable L: Low, M: Medium; H: High.

9.4.5.5 Loss of Wetland Vegetation

During construction, clearing activities near stream crossings or wetlands could result in a direct loss of wetland vegetation. Land within the PDA will be disturbed by vegetation removal and soil disturbance as surfaces are prepared for drilling and tower installation. The effect of clearing activities on loss of wetland vegetation is characterized as being adverse, low in magnitude and restricted to the PDA and LAA. The effect will occur once during the construction phase and will be irreversible. Transmission line routing has considered the location of wetlands and these have been avoided wherever possible. Where construction is necessary near wetlands, buffers, as defined in Chapter 10 will be employed. The residual effects of the Project on wetland vegetation are assessed as being not significant.

9.4.6 Cumulative Environmental Effects on Natural Vegetation

This section consists of an evaluation of the effects of the Project on natural vegetation in combination with the effects of other projects or activities that will likely overlap spatially and temporally with those of the Project. The focus of this cumulative effects assessment is on those residual project effects identified in the section above. These effects are considered in relation to the past, current and reasonably foreseeable future projects and activities listed in the table below, to evaluate the potential for the effects from the Project to act cumulatively in a manner that could cause a change in the VC that will alter its status or integrity beyond an acceptable level, relative to the established threshold.

The potential for interaction between the effects of the Project on natural vegetation and the effects of other identified past, current and future projects and activities are presented in Table 9.4-6. Projects will have an interaction ranked as 0 if Project environmental effects do not overlap spatially and temporally with those of other projects and activities, and, therefore, do not have the potential to act cumulatively with those of other projects and activities. Interactions ranked as 1 are Project environmental effects that act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). Interactions ranked as 2 are those interactions where Project environmental effects act cumulatively with those of other projects and activities, and may exceed acceptable levels without the implementation of project-specific or regional mitigation.

Table 9.4-6: Potential Cumulative Environmental Effects on Natural Vegetation

Other Projects and Activities with Potential for Cumulative Environmental Effects		Potential Cumulative Environmental Effect			
		Change in SOCC or their Habitat	Spread of Invasive or Non-native Plants	Change in Natural Vegetation Distribution	Loss of Wetland Vegetation
Infrastructure Projects	PTH 59 Twinning	1	1	1	1
	PTH 52 Twinning	1	1	1	1
	PTH 75 Rehabilitation	0	0	0	0
Residential Projects	Sage Creek Residential Development	1	1	1	0
Energy Projects	Manitoba-Minnesota Transmission Project	1	1	1	1
	Bipole III Transmission Project	1	1	1	1
	St. Joseph Windfarm Project	1	1	1	1

KEY:

Cumulative environmental effects were ranked as follows:

0 = Project environmental effects do not act cumulatively with those of other projects and activities.

1 = Project environmental effects act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of beneficial management or codified practices.

2 = Project environmental effects act cumulatively with those of other projects and activities and the resulting cumulative effects may exceed acceptable levels without implementation of project-specific or regional mitigation.

9.4.6.1 Infrastructure Projects

Future infrastructure projects that will overlap spatially with the Project include the twinning of PTH 59 and PTH 52. PTH 59 runs south of Winnipeg and intersects with the proposed St. Vital to Letellier (V95L) route three times. Of the total length of PTH 59 that requires twinning, approximately 41 km crosses the RAA and 12 km cross the LAA. PTH 52 runs east from PTH 59 and intersects with the proposed St. Vital to Letellier (V95L) route once. Of the total length of PTH 52 that requires twinning, approximately 7 km crosses the RAA, 2 km of which transects the LAA perpendicularly. These twinning projects may: have an environmental effect on SOCC populations and their habitat, increase the spread of non-native and invasive plants, change vegetation distribution and/or cause a loss in wetland vegetation.

Similar to the proposed Project, both PTH 59 and PTH 52 travel through highly disturbed landscapes where agricultural cropland is the predominant land cover type. Agricultural cropland provides marginal habitat for plant SOCC, and is subject to the colonization of non-native and invasive plants. Although the highways cross rivers/streams which may need to be widened, these crossings have already been altered from their natural state. As such, additional loss of wetland and riparian vegetation will likely be minimal.

Residential Projects

Sited on an area of previously intensively cultivated agricultural land which provided little or no habitat for natural vegetation, the Sage Creek residential development on the east side of Winnipeg consists primarily of residential housing. Any further development at Sage Creek will be incremental to the residential development that has already occurred. As such, no Project-related effects causing additional changes to SOCC and their habitats, the spread of invasive and non-native plants, natural vegetation distribution and loss of wetlands are anticipated to occur.

9.4.6.2 Energy Projects

9.4.6.2.1 Transmission

There will be temporal and spatial overlap between the proposed Manitoba to Minnesota Transmission Project (MMTP) and the approved Bipole III Transmission Project (BPIII) project phases and the Project. The BPIII project crosses the proposed Project ROW once, south of Niverville. This portion of the BPIII transmission route includes a crossing of the Red River and traverses mostly agricultural cropland. Agricultural cropland provides marginal habitat for plant SOCC, and is already suffering from the colonization of non-native and invasive plants. Some river/stream/wetland crossings for MMTP and BPIII may contribute to loss of wetland/riparian vegetation. For the BPIII project, mitigation measures such as buffering of these crossings is expected to eliminate residual effects of the project on wetland vegetation (Manitoba Hydro 2012).

Route selection for MMTP is still in process. The proposed route options share the Southern Loop corridor with the Project, and traverse the Project RAA in the RM of Tache.

Both the BPIII transmission route and the proposed MMTP route option nearest to the RAA transect primarily agricultural habitat.

9.4.6.2.2 Wind-Energy

The St. Joseph Windfarm is located near St. Joseph, MB west of PTH 75, south of PTH 14 and north of PR 421. This windfarm consists of 60 - 2.3MW turbines and will overlap spatially and temporally with the Project RAA. The St. Joseph Windfarm is situated in an agricultural dominated landscape where most turbines have been placed on annual cropland. The only vegetation communities affected by this project are agricultural areas and portions of some hedgerows that were cleared for access roads (Helimax 2008).

9.4.6.3 Summary of Project Cumulative Environmental Effects on Natural Vegetation

The total cumulative effect to natural vegetation consists of changes in SOCC populations and their habitat, spread of invasive or non-native plants, changes in vegetation distribution and the permanent loss of wetlands under project footprints in association with the energy (transmission projects and wind energy projects) and highway twinning projects. The overall magnitude of the change in these effects is considered moderate as the areal change in natural vegetation will be measureable. This change in natural vegetation within the context of the RAA is small and relatively minor, due to the predominantly highly disturbed state of the landscape from agricultural practices. The changes to natural vegetation, with the exception of the loss of wetlands, are considered reversible throughout the life of the projects considered. Although the vegetation in these areas will be altered during construction, appropriate mitigation to avoid adverse effects on natural vegetation will be implemented. Project-related disturbance will be minimized and areas returned to pre-construction condition (to the extent possible), with the focus to maintain the function of vegetation (e.g., maintaining riparian area vegetation) and wetland communities.

A summary of the characterization of the cumulative effects on natural vegetation, including the cumulative environmental effects with the Project and the Project contribution to cumulative effects, is presented in Table 9.4-7. The characterization of cumulative residual environmental effects are considered following the mitigation prescribed to minimize project effects, as well as any follow-up and monitoring recommended.

Cumulative effects to natural vegetation are not anticipated to result in environmental effects that will impair the viability of natural vegetation within the RAA and have therefore been rated not significant.

Table 9.4-7: Summary of Cumulative Residual Environmental Effects on Natural Vegetation

Cumulative Environmental Effect and Project Contribution		Cumulative Residual Environmental Effects Characteristics						Significance	Likelihood of Significant Effect
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Ecological/Socio-Economic Context		
Effects to SOCC or their Habitat	Cumulative Effect with Project	A	L	L	MT/ S	R	HD	N	N/A
	Project Contribution to Cumulative Effect	A	L	L	MT/ S	R	HD	N	N/A
Spread of Invasive or Non-native Plants	Cumulative Effect with Project	A	L	L	MT/ C	R	HD	N	N/A
	Project Contribution to Cumulative Effect	A	M	L	LT/ C	R	HD	N	N/A
Vegetation Distribution	Cumulative Effect with Project	A	M	L	MT/ S	R	HD	N	N/A
	Project Contribution to Cumulative Effect	A	M	L	MT/ S	R	HD	N	N/A
Loss of Wetland Vegetation	Cumulative Effect with Project	A	M	L	MT/ S	I	HD	N	N/A
	Project Contribution to Cumulative Effect	A	M	L	MT/ S	I	HD	N	N/A

KEY:

Direction: P: positive; A: adverse; N: Neutral

Magnitude: N: Negligible; L: Low; M: Moderate; H: High

Geographic Extent: L: Local- within the PDA/LAA; R: Regional - within the RAA

Duration: ST: Short-term; MT: Medium-term; LT: Long-term; P: Permanent – will not change back to original condition

Frequency: S: Single Event I: Infrequent; F: Frequent; C: Continuous.

Reversibility: R: Reversible; I: Irreversible.

Ecological/Socio-economic Context: LD: Low-disturbance; MD: Moderate-disturbance; HD: High-disturbance

Significance: S: Significant; N: Not Significant.

Likelihood of Significant Effect: Based on literature review and professional judgment. N/A: Not Applicable L: Low, M: Medium; H: High.

9.4.7 Follow-up and Monitoring

The following activities are recommended for follow-up and monitoring to evaluate effectiveness of mitigation measures:

- Pre-clearing surveys in areas identified as having potential to provide habitat for SOCC.
- Monitoring for invasive species and managing as per the *Noxious Weeds Act* (2010).

9.4.8 Summary

Construction of the Project will result in minimal effects on natural vegetation during the construction period. During Project operations, little or no effect on natural vegetation is anticipated.

9.5 WILDLIFE – OVERVIEW OF VALUED COMPONENTS

9.5.1 Selection of Wildlife Valued Components

Wildlife is highly valued for social, cultural and/or regulatory reasons. A number of species are protected under Manitoba's *Wildlife Act*, migratory birds are protected under the *Migratory Bird Convention Act* (MBCA), and some species are protected under the federal *Species at Risk Act* and/or the *Manitoba Endangered Species Act* (MESA). Three Valued Components (VCs) have been selected to assess effects of the Project on wildlife:

- Birds (including migratory birds).
- Mammals.
- Species of Conservation Concern (SOCC).

Due to the vast number of species encompassed by the wildlife VCs, Key Indicators (KIs) were selected to focus the assessment on birds, mammals and Species of Conservation Concern (SOCC). Due to the potential for project interactions, Canada goose and sharp-tailed grouse were selected as the KIs for the birds VC, white-tailed deer was selected for the mammals VC, and northern leopard frog, short-eared owl and American badger were selected as KIs for the SOCC VC.

Agricultural development in the Project area limits the potential for invertebrate diversity in the Project footprint. This, in turn, greatly reduces the likelihood of Project-related effects on invertebrate populations. Although Project development will include land clearing, loss or alteration of native plant communities following these activities will be minimal. Development of the Project is anticipated to have limited interaction with invertebrate populations. Consequently, invertebrates were not chosen as a VC.

9.5.2 Regulatory Setting

The assessment of the potential environmental effects of the Project on wildlife focuses on a selection of KIs (and their associated habitats) that are protected under one or more of the following acts:

- *The Wildlife Act* (Manitoba)
- *Manitoba Endangered Species Act* (MESA)
- Federal *Species at Risk Act* (SARA)
- *Migratory Bird Convention Act* (MBCA)

Species listed by COSEWIC that are not protected by an act or regulation, were also considered. The *Manitoba Planning Act* and federal and provincial guidance documents were consulted in the development of mitigation measures for minimizing disturbance on wildlife and wildlife habitat within the LAA.

9.5.2.1 *The Wildlife Act* (Manitoba)

The Manitoba *Wildlife Act* (1987) prohibits activities such as the hunting, killing, capturing, taking, possessing, importing, exporting, buying or selling of wild animals except as permitted by the Act, a regulation or a permit. A "wild animal" is defined as being an animal of a species listed in Schedule A to the Act or declared by a regulation under the Act to be a wild animal. This includes all amphibians, select mammals, most birds (including those not protected under the *Migratory Bird Convention Act* [i.e., hawks, eagles, owls, pelicans, crows, jays and some species of blackbirds]) known to exist in Manitoba, and a limited list of reptile species.

9.5.2.2 Manitoba Endangered Species Act

The Manitoba *Endangered Species Act* (1998; MESA) ensures the protection of threatened and endangered species in Manitoba. Through this Act, species are designated as threatened, endangered, extirpated or extinct, and management plans are developed for the maintenance and/or reintroduction of extirpated species into the province. This legislation may be applied to any mammal, bird, reptile, amphibian, fish, or plant. Although individual management plans may include suggestions for industrial activity restriction guidelines, the Act itself does not include activity restriction guidelines that are used for listed species.

9.5.2.3 COSEWIC

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is comprised of experts that assess and designate which wildlife species are considered to be in some danger of disappearing from Canada. Designation under SARA takes into consideration the recommendations of the COSEWIC assessments. Species that have been assessed by COSEWIC but not yet listed under SARA are not afforded legal protection, but are still considered SOCC in this assessment.

9.5.2.4 The *Species At Risk Act*

The purpose of the federal *Species at Risk Act* (2002; SARA) is to protect species at risk in Canada. Recovery plans are developed for species that are listed under the SARA as extirpated, threatened or endangered. Listed species of special concern are managed to prevent them from becoming threatened or endangered. SARA guides developers to avoid:

- Killing, harming or harassing endangered or threatened SAR (sections 32 and 36).
- Destroying critical habitat of endangered or threatened SAR (sections 58, 60 and 61).
- Contravening regulations established from actions plans (section 53), management plans (section 71) or other regulations outlining the protection of critical habitat (section 59).

9.5.2.5 *Migratory Bird Convention Act* (1994)

The federal *Migratory Birds Convention* Act (1994; MBCA) and regulationsprovide for the protection of migratory birds, their eggs and their nests. Many of the songbirds, waterfowl, waterbirds and woodpeckers whose ranges overlap with the Project area are protected under this legislation.

9.6 WILDLIFE: BIRDS

Birds are represented by a diversity of groups, such as songbirds, raptors, waterbirds, upland game birds and woodpeckers that occupy a wide array of habitats. Birds were selected as a VC because they play an important role in maintaining the natural balance of ecosystems and are considered to be valuable indicators of environmental change. As herbivores, omnivores and scavengers, birds are critical links in many food chains and therefore, are also linked to other VCs.

Activities related to the construction, operation and maintenance of the Project will have direct and/or indirect effects on birds and bird habitat. This assessment of potential effects focused on habitat availability as the presence of habitat directly influences the ability of an area to support specific bird species. This, in turn, influences the diversity and abundance of birds in the assessment areas. As many of the bird species that utilize habitats within the Project assessment areas are migratory and do not occupy the local area year-round, Project effects are anticipated to be concentrated within the bird migratory and breeding bird seasons.

9.6.1 Scope of Assessment for Birds

9.6.1.1 Regulatory Setting

The assessment of the potential environmental effects of the Project on birds includes a consideration of species and their associated habitats that are listed under various federal and provincial acts and regulations (Section 9.5.2), including the following:

- *Migratory Bird Convention Act* (1994)
- Manitoba's *The Wildlife Act* (1987)
- Environment Canada Activity Restriction Guidelines (2009)

9.6.1.2 Boundaries

The temporal boundaries for the assessment of potential effects of the Project on birds include the duration of Project construction, operation and maintenance periods; see Section 3.7 for the Project construction schedule. Operation and maintenance of the Project will begin following construction and will be carried out until project decommissioning. The potential for Project environmental effects will peak during construction, and will diminish during operation and maintenance.

Many of the bird species that utilize habitats within the Project assessment areas are migratory, and therefore do not occupy the local area year-round. As such, potential for Project effects should be concentrated within the bird migratory and breeding seasons.

The spatial boundaries for the environmental effects assessment on birds are as follows:

Project Development Area (PDA): The PDA for the bird assessment includes the area within which all physical construction activities associated with the Project will take place. The PDA includes 119 km of transmission line between St. Vital Station and Letellier Station, and 37 km of transmission line between St. Vital Station and La Verendrye Station, and upgrades at the station sites (Map 9-5). For the purposes of this assessment, a 40 m ROW was used.

Local Assessment Area (LAA): The LAA for the bird assessment is a 2 km-wide corridor (1 km buffer on either side of the ROW centre-line) encompassing the PDA (Map 9-5). One kilometre on either side of the line is sufficient to encompass the effect of sensory disturbance from Project-related traffic and construction noise (Ruddock and Whitfield 2007) on birds.

Regional Assessment Area (RAA): The RAA for the bird assessment includes a 10 km-wide buffer (5 km on either side) encompassing the PDA (Map 9-5). The buffer was limited to 5 km to reduce the effect of the City of Winnipeg being located adjacent to the Southern Loop corridor and the northern portion of the St. Vital to Letellier (V95L) route. This large urban area was considered to be a confounding factor when assessing this predominantly rural project.

The following administrative boundaries apply to the assessment of birds:

Forest Management Guidelines for Terrestrial Buffers

Manitoba Conservation Forest Practices Initiative (2010) provides guidance on the minimum size of terrestrial buffers to apply to important and sensitive cultural features (e.g., snake hibernacula, active large stick nests) potentially affected by forestry operations. This guidance was incorporated in the buffers and setbacks provided in Chapter 10 and will be used to guide mitigation efforts where these important and sensitive cultural features overlap with the PDA and/or the LAA.

Saskatchewan Activity Restriction Guidelines

The Saskatchewan Ministry of Environment has developed activity restriction guidelines for sensitive species (e.g., sharp-tailed grouse). In absence of available federal guidelines for sensitive bird species that have potential to occur in the RAA, this guidance was incorporated in the buffers and setbacks provided in Chapter 10.

9.6.1.3 Identified Issues and Concerns

During engagement activities, comments received regarding birds included using bird diverters in certain areas, avoiding east-west alignment of the line to reduce effects on birds and concerns about the potential for effects to waterfowl.

9.6.2 Project Interactions with Birds

Table 9.6-1 ranks the potential of an environmental effect on birds to result from interactions between the environment and Project activities. Further assessment of residual environmental effects is based on rating values assigned in this table.

Table 9.6-1: Potential Project Environmental Effects on Birds

Project Activities and Physical Works	Potential Environmental Effect		
	Change in Bird Habitat Availability	Change in Bird Distribution	Change in Bird Mortality Risk
Construction:			
Clearing	2	2	2
Drilling	0	1	1
Marshalling Yards	1	1	1
Tower Installation	1	1	1

Table 9.6-1: Potential Project Environmental Effects on Birds

Project Activities and Physical Works	Potential Environmental Effect		
	Change in Bird Habitat Availability	Change in Bird Distribution	Change in Bird Mortality Risk
Stringing Conductors	0	0	0
Presence of Materials and Equipment	1	1	1
Site Reclamation	1	0	0
Operation and Maintenance:			
Project Presence	2	2	2
Maintenance of Infrastructure	0	1	1
Vegetation Management	2	2	2

KEY:

Project-related Environmental Effects were ranked as follows:

0 = No interaction.

1 = Interaction may occur; however, based on past experience and professional judgment, the resulting environmental effect is well understood and can be managed to acceptable levels through General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). No determination of significance of residual effects or cumulative effects assessment is warranted.

2 = Interaction may occur and the resulting environmental effect may exceed acceptable levels without implementation of project-specific mitigation.

9.6.2.1 Justification and Rationale for Interactions Ranked as 1

The effects of interactions rated 1 are expected to have non-substantive interaction with birds or to be managed to acceptable levels through the planned implementation of well-established and proven mitigation. The rationale for ranking interactions as 1 is discussed below. Assessment of interactions ranked 2 occur in Section 9.6.5.

Limited increased vehicular traffic from drilling may result in an increase in bird mortality risk. The effect from these activities is expected to be localized and temporary. Drilling activities will also create noise that will result in sensory disturbance, and potential indirect habitat loss of birds (due to habitat avoidance). As these activities will specifically occur at tower installation sites, effects are expected to be more localized than clearing activities and have therefore, been ranked as 1.

Construction of marshaling yards and installation of towers ha both been ranked as 1 for changes in bird habitat availability and for change in bird mortality risk. Both activities will permanently remove a small portion of habitat from use by birds. Placement of marshaling yards and towers within annual cropland or previously developed land cover types will minimize the amount of bird habitat lost. Increased traffic at these sites may result in a small temporary increase in bird mortality events. Construction activities will result in short-term, local sensory disturbances to birds. Increased traffic during reclamation of marshalling yards and construction site areas may result in a small, short-term increase in bird mortality events. Localized, short-term sensory disturbance will occur during reclamation. Traffic and sensory disturbance may also cause avoidance of certain areas, resulting in small, short-term habitat loss. Site reclamation will reduce the overall amount of bird habitat lost as a result of the Project; this effect is considered to be positive and long term.

Presence of equipment and materials has been ranked as 1, and will potentially result in a loss of bird habitat during the construction period. This effect is temporary and is expected to be localized. Increased traffic may result in a small increase in bird mortality events. Presence of equipment and materials will result in a short-term sensory disturbance to birds.

9.6.2.2 Selection of Key Indicators

Two bird species were selected as key indicators to represent the effects of the Project on birds: Canada goose and sharp-tailed grouse.

Waterfowl are known to be among the bird groups most susceptible to transmission line collisions (Rioux et al. 2013). Canada goose, as a representative of this bird group and other birds that use riparian habitats, is a common species in the LAA and RAA. This species is often in high abundance during migration, and utilizes both riparian and upland habitats. As such, Canada goose has been selected as a key indicator species for the assessment of potential Project-related environmental effects.

Sharp-tailed grouse prefer open grassland habitats, with minimal shrub or tree cover, on which to establish their courtship areas, or ‘leks’ (Connelly et al. 1998). These habitats provide limited perching opportunities for aerial predators and minimize presence of structures to impede visibility of potential ground predators. Sharp-tailed grouse return to leks on an annual basis but have a tendency to avoid established lek grounds in response to habitat disturbances (Baydack and Hein 1987). This, in combination with the limited availability of suitable lek habitat in agriculturally dominated landscapes, has raised concern for the long-term success of this species. Sharp-tailed grouse are not listed as an at risk species by provincial or federal legislation, but Saskatchewan Environment has identified the sensitivity of sharp-tailed grouse to breeding habitat disturbances and has developed grouse lek setback distance guidelines for project-related activities proposed in the areas of known lek locations (Saskatchewan Environment 2013). As a result of this sensitivity to disturbance, sharp-tailed grouse have a high likelihood of experiencing environmental effects as a result of the Project. As such, sharp-tailed grouse have been selected as a key indicator species for the assessment of potential environmental effects on grassland birds.

9.6.2.3 Selection of Environmental Effects and Measurable Parameters

The environmental assessment of birds is focused on the following environmental effects:

- Change in habitat availability
- Change in mortality risk
- Changes in distribution of birds

Table 9.6-2 presents the measureable parameters used for assessing the effects of the Project on birds. These measurable parameters were based on the professional judgment of the Study Team. Some of the measurable parameters have clear units of measurement and are indicative of change in local bird populations and their habitats. Other parameters are difficult to measure and thus are discussed qualitatively (e.g., changes in noise or light levels).

Table 9.6-2: Measurable Parameters for Birds

Environmental Effect	Measurable Parameter	Rationale for Selection of Measurable Parameter
Change in habitat availability	Changes in areal extent (ha) and quality of breeding, overwintering, or unique habitats	Addresses the loss of natural habitat which is already limited within the Project assessment areas due to pre-existing development
		The Project assessment areas already constitute a highly homogenous landscape. Areas with unique features may contain critical and limited bird habitat.
Change in Mortality Risk	Transmission line or tower/bird collisions / vehicle/ bird collisions / mortality/nest loss due to Project construction and/or maintenance	Addresses the loss of birds, including nests, eggs and young due to the presence of Project infrastructure, project construction / maintenance, and/or increased traffic during phases of Project development
Change in Bird Distribution (from sensory disturbance)	Changes in the distribution of birds (density of birds/ha)	Addresses changes in bird habitat use due to presence of equipment and personnel, especially at night and during critical timing windows (i.e., potential disruption of daily/migratory movement patterns due to presence of equipment/humans).

9.6.3 Residual Environmental Effects Description Criteria

Parameters listed in Table 9.6-3 are used to characterize and evaluate residual environmental effects of the Project on birds.

Table 9.6-3: Characterization of Residual Environmental Effects for Birds

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The ultimate long-term trend of the environmental effect	**Positive** – an increase in habitat availability, distribution and/or reduction in mortality risk within the RAA or LAA
		Adverse – a decrease in availability, distribution and/or increase in mortality risk within the RAA or LAA
		Neutral – no net change in availability, distribution and/or reduction in mortality risk within the RAA or LAA
Magnitude	The amount of change in a measurable parameter or variable relative to the baseline case	**Negligible** – no measurable change in bird habitat availability, mortality risk or distribution in the RAA or LAA
		Low – a very small measurable change in bird habitat availability (<5% of total available breeding habitat within the RAA), mortality risk or bird distribution in the RAA or LAA
		Moderate – a measurable change to bird habitat availability (5-20% of total available breeding habitat within the RAA), mortality risk or bird distribution in the RAA or LAA
		High – a measurable and substantive change to bird habitat availability (>20% of total available breeding habitat), mortality risk or bird distribution in the RAA or LAA
Geographical Extent	The geographic area within which the environmental effect of a defined magnitude occurs	**PDA/LAA** (Local) – effects on bird habitat, mortality risk and distribution of birds are restricted to the PDA/LAA
		RAA (Regional) – effects on bird habitat, mortality risk and distribution of birds extends into the RAA

Table 9.6-3: Characterization of Residual Environmental Effects for Birds

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Timing and Frequency	When the effect occurs and the number of times during the project or a specific project phase that an environmental effect may occur	**Once** –effect considered to be a one-time event
		Infrequent –effects considered to likely occur a few times per year
		Frequent – effects are likely to occur more than a few times per year
		Continuous – effects considered to occur for the life of the project (construction through decommissioning)
Duration	The period of time required until birds returns to the baseline condition, or the effect can no longer be measured or otherwise perceived	**Short-term** – effects to bird habitat, mortality risk and bird distribution will be restricted to construction phase
		Medium-term – effects to bird habitat, mortality risk and bird distribution will continue through operational phase
		Long-term – effects to bird habitat, mortality risk and bird distribution will continue past project decommissioning
Reversibility	Reversibility pertains to whether or not the residual effect can be reversed once the physical work or activity causing the disturbance ceases.	**Reversible** – bird habitat will recover and mortality risk will cease after project decommissioning
		Irreversible – effects to bird habitat are permanent
Ecological and Socio-economic Context	The general characteristics of the area in which the project is located	**Low-disturbance** – land supports large, intact areas of natural vegetation/bird habitat
		Moderate-disturbance – land has been modified for agriculture and/or human development yet supports some large areas of natural vegetation/bird habitat
		High-disturbance – land has been highly modified for agriculture and/or other human development; much of the original natural vegetation/bird habitat has been converted to other land uses

Table 9.6-3: Characterization of Residual Environmental Effects for Birds

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Likelihood of Significant Effect	The likelihood that a significant effect will occur	**Low** – a low likelihood of a significant effect occurring
		Medium – a medium likelihood of a significant effect occurring
		High – a high likelihood of a significant effect occurring

9.6.3.1 Significance Thresholds for Residual Environmental Effects

Residual effects rating criteria for potential environmental effects of the Project on birds, in combination with professional judgement, are considered significant if they result in an effect that causes changes in abundance and distribution of a species such that its population would no longer be secure in the RAA.

9.6.4 Existing Conditions for Birds

9.6.4.1 Baseline Data Sources

Documentation of existing environment conditions for bird communities in the Project relied on the following data sources:

- Canadian Land Cover classification (LCC)
- Aerial photos of the Project assessment areas (RAA/LAA)
- Historical breeding bird survey data from the North American Breeding Bird Survey Program and the Manitoba Breeding Bird Atlas
- Bird survey data collected in the Project RAA/LAA during the 2013 field program (Appendix C)
- Bird survey data collected during environmental assessment studies of other proposed projects within the Project RAA

Documentation of existing environment conditions for bird communities in the Project assessment areas (Section 5.3.2.2) was completed through analysis of federal land cover information (Government of Canada 2009), to determine bird habitat availability and potential of these habitats to support various bird groups and species. This data was further used to calculate total areas of potential direct habitat loss through Project related activities.

Multi-year bird survey results were reviewed to determine species of birds utilizing habitats in the Project assessment areas. Bird survey information was obtained from the North American Breeding Bird Survey program (USGS 2013), as well as the Manitoba Breeding Bird Atlas (2013). Records from Manitoba Conservation Data Centre (MBCDC 2013) of species of conservation concern observations also assisted in this documentation. Analysis of this information determined that sufficient data on existing bird communities was available for the majority of the Project area, with the exception of the southeastern corner. As this area supported some of the most diverse bird habitat available in the Project area (i.e., greater representations of grassland and forested land cover relative to annual cropland) additional road-based breeding bird surveys were conducted by Stantec Consulting Ltd. in June 2013 along roads that transected grassland and deciduous forest habitats. Data collected from these surveys provided information on bird communities utilizing habitats in this section of the Project area and supplemented existing information sources (Appendix C).

9.6.4.2 Baseline Overview

Historical survey data identified Canada goose (KI) as a species common to the RAA, particularly during the spring and fall migratory seasons. This species nests in a variety of habitat types; however, nesting sites located near water are preferred (Mowbray et al. 2002). Geese will nest in a broad variety of locations and habitats, however, their primary nesting habitat in Manitoba is in the north, in areas such as the Hudson Bay Lowlands. (Poston et al. 1990) Within the RAA, riparian habitat encompasses only 1% of all land cover types. As a result, the availability of suitable nesting habitat for Canada goose is limited.

During spring and fall migration, harvested fields throughout the Project assessment areas provide ample feeding stopover areas for large flocks of waterfowl, particularly Canada geese. Historical bird migration survey data conducted within the RAA near the Red River confirmed high numbers of these species moving through the local area (Tetr*ES* 2007). Populations of Canada geese in Manitoba and across Canada are considered to be stable to increasing (USFWS 2013).

The distribution of the sharp-tailed grouse, the second key indicator bird species, is known to encompass the RAA (Carey 2003, Connelly 1998, Peterson 2002). Breeding habitats for sharp-tailed grouse generally consist of open upland areas with good visibility of surrounding landscapes, such as pasture or grassland habitats (Baydack 1988). Areas with deciduous trees and shrubs are also utilized during brood-rearing, foraging and over-wintering (Connelly 1998). Grassland, pasture, shrub and forest habitats are all present within the RAA and LAA, although limited in availability. While breeding evidence of sharp-tailed grouse within the RAA has been recorded by the Manitoba Breeding Bird Atlas (2014), 17% of the LAA (concentrated along the Floodway and the Southern Loop corridor) is classified as grassland. These areas are unlikely to support grouse leks. While sharp-tailed grouse were confirmed in the Project area during surveys conducted during the breeding season, no grouse leks were found, .

9.6.5 Project Environmental Effects on Birds

9.6.5.1 Analytical Methods

The assessment of Project-related environmental effects considered only the interactions ranked 2 in Table 9.6-1.

Assessment of residual environmental effects of the Project on birds was largely focused on types of habitat affected by the Project and the potential of these habitats to support key indicator species. Federal Land Cover Classification data (LCC; Government of Canada 2009) for the Project was consulted to establish baseline availability of preferred KI breeding habitats within the assessment areas. For each KI, key breeding habitat attributes were identified based on a review of published scientific literature and professional judgment.

Land cover classification categories that correspond to these habitat attributes were then selected and queried from the LCC coverage of the Project assessment areas to create a LCC based dataset of preferred habitats specific to each KI. This LCC data was used to calculate the potential loss and/or alteration of suitable habitat associated with Project development. The potential for Project activities to affect various KI habitat types, and therefore KI communities, determined how residual Project environmental effects were characterized.

9.6.5.2 Assessment of Change in Bird Habitat Availability

Table 9.6-4 summarizes the effects of the Project on bird habitat availability (interaction ranking of 2) for the KI species. These effects are discussed in more detail for the construction and operation phases below.

Table 9.6-4: Changes to Bird Habitat Availability as a Result of the Project

Key Indicator	Project Phase	
	Construction	Operation
Canada Goose	Loss or alteration of riparian habitat resulting from vegetation clearing. Minimal habitat loss	Loss or alteration of riparian habitat resulting from vegetation management
	Negligible loss of foraging habitat (cropland)	
Sharp-tailed Grouse	Indirect loss of habitat due to sensory disturbance; loss of habitat due to land clearing	Loss and/or alteration of habitat as a result of vegetation management

9.6.5.2.1 Construction-related Effects

During construction, clearing activities have been ranked as 2 for changes in bird habitat availability. For this activity, land within the Project footprint will be disturbed by vegetation removal and soil disturbance as surfaces are prepared for drilling and tower installation. Clearing activities will result in direct loss and/or fragmentation of bird habitat. The magnitude of the effect of clearing activities is dependent on land cover types transected by the proposed routes, and the birds those areas may support. The vulnerability of a bird species to habitat loss is dependent on their degree of habitat specialization; birds with broad-ranging habitat requirements are less likely to be affected (Hockey and Curtis 2008). Conversely, species that are highly specialized for small, rare habitat features are extremely vulnerable to any habitat loss (Hockey and Curtis 2008).

Annual cropland and developed areas provide marginal bird habitat for some bird species, while treed, grassland and wetland land cover types provide more productive bird habitats for a diversity of species. High-quality wildlife habitat was a criterion in the routing process which was weighted against other criteria attempting to minimize overall effects. Planned mitigation measures will further assist in minimizing the effects of construction related activities on bird habitat availability.

Modifications to the existing St. Vital, La Verendrye and Letellier stations will occur within the fenced station sites. As such, there are no Project-related effects on bird habitat availability are expected to occur.

Key Indicator Species – Canada Goose

Land clearing during the construction phase will result in minimal loss of nesting habitat for Canada goose as the preferred routes were selected to avoid wetlands and other water bodies where possible. This loss will be negligible as the Project is not located in preferred nesting habitat for Canada Geese. Although geese will nest in a broad variety of locations and habitats, their primary nesting habitat in Manitoba is in the north, in areas such as the Hudson Bay Lowlands (Poston et al. 1990). Less than 1% of the total length of each route will be traversing riparian habitats. Potential loss of agricultural cropland, which is potential foraging habitat for Canada goose during migration, is negligible due to the vast availability of this land cover type throughout the RAA.

Key Indicator Species – Sharp-tailed Grouse

Land clearing during the construction phase will disrupt and/or fragment potential sharp-tailed grouse habitat within the LAA. Close to 24% of the total length of the St. Vital to Letellier (V95L) route will intersect grassland and pasture land cover and 2% will transect deciduous forest, while 15% of the La Verendrye to St. Vital Transmission Line (Y36V) route will intersect grassland and pasture and 3% will intersect deciduous and shrub land cover types.

9.6.5.2.2 Operation-related Effects

Presence of the Project was ranked as 2 for changes to bird habitat availability as there will be direct habitat alteration as a result of Project infrastructure. Vegetation management techniques along the ROW could also result in changes to habitat structure and availability; this activity was also ranked as 2.

The St. Vital, Letellier and La Verendrye stations will continue to operate as they currently do during the operations and maintenance phases of the Project, therefore operations-related Project effects on bird habitat availability are not expected to occur.

Key Indicator Species – Canada Goose

Riparian habitats, utilized by Canada goose for nesting purposes, are limited within the Project assessment areas. As a result of the Project presence within the PDA, approximately 620 ha of this habitat will be altered due to infrastructure. Total area of riparian habitat lost however, has been mitigated through the route selection process as preferred routes were positioned to avoid wetlands and other waterbodies where possible. Loss of agricultural cropland, or potential foraging habitats for Canada goose during migration, is negligible due to the vast availability of this land cover type elsewhere in the LAA.

Key Indicator Species – Sharp-tailed Grouse

Grasslands and pastureland, utilized by sharp-tailed grouse for breeding, are limited within the Project assessment areas. Approximately 90 ha of this habitat will be traversed by the transmission line ROW. Although direct effects on the grassland will be limited, there is potential for effects as a result of creation of hunting perches for raptors. Transmission line routing plays a role in mitigation by attempting to minimize the overall effects of the project (details provided in chapter 8). Protected Areas, Ecological Reserves, and Special Conservation Areas were all Areas of Least Preference during the routing process, providing the highest level of protection during route selection. Native grasslands were a criterion in the routing process which was weighted against other criteria attempting to minimize overall effects.

In some areas of the PDA where forest habitats will be cleared, newly created habitats could increase the area of breeding habitat available to sharp-tailed grouse. Frequency and timing of vegetation management practices along the ROW will influence the potential of this habitat.

9.6.5.2.3 Mitigation for Project Effects on Bird Habitat Availability

Mitigation measures used to mitigate effects on bird habitat during Project construction and operation include:

- A 30-m vegetated buffer will be retained around wetlands, streams and other river crossings.
- Pre-construction nest searches will be carried out if construction activity overlaps with the breeding bird timing windows (See Table 10.3-1).
- Grouse lek searches in grassland and pasture habitats will be conducted if construction activities overlap with the grouse breeding period (March 15 to May 15) and lek setback guidelines will be implemented.
- Where possible, low woody vegetation will be maintained along the ROW to enhance bird habitat. Federal or Saskatchewan bird/bird SOCC nest setback guidelines will be implemented.
- Any additional mitigation measures specific to bird habitat outlined in the Project Construction Environmental Protection Plan (EnvPP) will be implemented.

9.6.5.3 Assessment of Change in Bird Mortality Risk

Table 9.6-5 summarizes the effects of the Project on bird mortality risk for the key indicator species. These effects are discussed in more detail for the construction and operation phases below.

Table 9.6-5: Changes to Bird Mortality Risk as a Result of the Project

Key Indicator	Project Phase	
	Construction	Operation
Canada Goose	Increased mortality from vehicle collisions	Transmission line collision during migration
Sharp-tailed Grouse	Increased mortality near leks	Increased mortality near leks during vegetation management
		Increased predation from avian predators if a transmission tower is near a lek

9.6.5.3.1 Construction-related Effects

Collisions with road vehicles are among the top five causes of human-related bird mortality in Canada (Calvert et al. 2013). The presence of crews carrying out clearing activities will result in an increase in traffic as workers will be travelling to, from and within the Project assessment areas. This increase in traffic may, in turn, lead to an increased potential for bird mortality risk (i.e., bird-vehicle collisions). Of all construction-related activities it is anticipated that traffic volumes will be highest during clearing activities. Unlike most natural predation and bird deaths, vehicle collisions have potential to remove healthy and mature breeding birds from populations (Bishop and Brogan 2013). Although potential for bird-vehicular collisions varies with many factors such as season, time of day, and habitats adjacent to road, raptors and passerines have been identified as two bird groups commonly recorded in vehicle-related bird mortality studies in Canada (Bishop and Brogan 2013). Vehicle collisions have also been identified by COSEWIC as being a contributing factor to the decline of some species at risk (i.e., bank swallow, common nighthawk, short-eared owl; COSEWIC 2013, 2007b, 2007d).

Key Indicator Species – Canada Goose

A recent literature review of bird-vehicle mortality studies in North America revealed few recorded occurrences of Canada goose mortality resulting from vehicle collisions (Bishop and Brandon 2013). However in some areas where nesting habitat is limited, Canada geese have been recorded to nest in roadside ditches (Carey et al. 2003) which may increase their collision risk. Within urban areas, such as those immediately adjacent to and within the City of Winnipeg, Canada geese are likely habituated to vehicles and may also be more susceptible to vehicle-collisions.

Although Project clearing activities may potentially increase the Canada goose mortality risk from vehicle collisions, Canada goose populations are considered to be stable and/or increasing country-wide (USFWS 2013) and therefore, loss of a few individuals would likely be negligible to local populations.

Key Indicator Species – Sharp-tailed Grouse

Although sharp-tailed grouse mortality as a result of vehicle collisions is not well documented in the literature, studies have found that other upland game birds have been recorded as casualties in vehicle-caused bird mortality studies (Clevenger 2003, Bishop and Brogan 2013).

Given that sharp-tailed grouse demonstrate site-fidelity to existing leks, there is potential for increased abundance of individuals within potential grouse lek habitat during the breeding season. At this time, mortality risk from construction related vehicle collisions may increase if a lek is situated in close vicinity to or within the transmission ROW.

9.6.5.3.2 Operation-related Effects

Operation-related project activities have the potential to increase bird mortality risk of species utilizing habitats within the Project assessment areas. Project presence was ranked as 2 for possible bird mortalities resulting from collisions with transmission wires, electrocutions, increased predation and potential brood parasitism.

Collisions with transmission lines are among the top five causes of human-related bird mortality in Canada (Calvert et al. 2013). Risk of bird-transmission line collisions is influenced by several factors relating to physical characteristics of the bird (species, age, size, health), general flight activity of the bird (flocking, aerial courtship displays, nocturnal flight versus day flight, perching), characteristics of the transmission line and a variety of environmental factors (weather, habitat, location; APLIC 2012). American and European studies report waterfowl, waterbirds (especially cranes), raptors and passerines to be among the bird groups most susceptible to transmission line collisions (Bevanger 1998; Janss 2000; Erickson et al. 2001; Rubolini 2005; APLIC 2012; Rioux et al. 2013).

Project infrastructure will cross the Red River (a major watercourse that flows northward through the province and generally parallels the southern portion of the RAA) twice. Increased flight activity during migration and the fact that the Red River is used as a navigational corridor by several bird species (including waterfowl and raptors) exacerbates the potential for increased numbers of bird collisions with transmission wires. Faanes (1987) reported that of fatal bird collisions with transmission lines and towers in North Dakota, waterbirds tended to experience the highest mortality rates (46%), followed by waterfowl (26%), shorebirds (26%), and passerines (5%).

Body size and behavior also influence a bird species' susceptibility to mortality from electrocution. Birds most likely to be affected by electrocution include those with large wingspans relative to body size and those that demonstrate perching behavior. Haas (1980 in Bervanger 1998) reported that of 50% of mortality experienced by falcons, hawks, eagles, and vultures that collide with transmission lines and towers results from electrocution. Crows and their allies; owls (7%); and passerines (3%) experience electrocution mortality rates of (37%, 7% and 3% respectively (Haas 1980 in Bervanger 1998).

Increased predation may occur along ROW habitats for some bird species. Fragmentation of contiguous patches of habitats and the creation of unnatural edges often increase predation rates for many avian species by both mammalian and avian predators (Chalfoun et al. 2002). Grouse may be particularly susceptible if leks are present on or adjacent to the ROW because mammalian predators may focus on the open areas (Chalfound et al. 2002). Transmission towers have been shown to increase the efficiency, and ultimately grouse mortality rates, of avian predators by providing elevated platforms for perching which increased predator visibility (e.g., Wakeley 1978, Graul 1980, Ellis 1984 and 1987, Plumpton and Andersen 1997).

Vegetation management activities may also result in the destruction of some nests, consequently increasing mortality risk of eggs and hatchlings. As such, vegetation management was assigned a 2 for its potential effect on bird mortality risk.

Key Indicator Species – Canada Goose

As a waterfowl species, Canada goose is a representative of one of the bird groups most commonly recorded in transmission line collision studies (Rioux et al. 2013). Canadian-based literature on vulnerability of Canada goose to electrocutions is not readily available; however, literature reviews of European and North American studies suggest that waterfowl have low susceptibility to transmission line electrocutions (Bevanger et al. 1998).

Transmission line routing plays a role in mitigation by attempting to minimize the overall effects of the project (details provided in Chapter 8). Stream/river crossings, wetland areas, and high-quality wildlife habitat were all criteria in the routing process which was weighted against other criteria attempting to minimize overall effects. Agricultural fields, the dominant land cover type within the Project assessment areas, seasonally attract large flocks of Canada goose as harvested grain crop fields are used as feeding areas during migration. As a result, collision risk for Canada goose may increase in these areas during migration periods.

The Red River is commonly used as a roosting site for Canada goose and other waterfowl during the fall migration season. Potential risk of transmission line collision at the Red River crossings, as well as other waterway crossings, increases for Canada goose during migration when birds fly at low-levels between riparian roosting sites and feeding areas in neighbouring agricultural fields.

Key Indicator Species – Sharp-tailed Grouse

Susceptibility of sharp-tailed grouse to transmission line collisions and/or electrocutions is not well documented in the literature. However, other upland game bird species (i.e., ruffed grouse) have been recorded, in low numbers, as casualties in transmission line bird mortality studies (Bishop and Brogan 2013).

Given that sharp-tailed grouse demonstrate site-fidelity to existing leks, there is potential for increased abundance of individuals within potential grouse lek habitat during the breeding season. At this time, mortality risk from vegetation management along the ROW may increase if a lek is situated in close vicinity or within the transmission ROW. However, this risk will be minimized through appropriate general mitigation measures as outlined in Chapter 10 through lek searches should construction activities commence during the grouse breeding season (March 15 – May 15).

Presence of transmission towers in the open landscape of the PDA may increase availability of perching sites for raptors hunting for prey. As a result, sharp-tailed grouse may experience a potential increase in mortality risk from raptor predation, particularly if a tower is located near a lek.

9.6.5.3.3 Mitigation for Project Effects on Bird Mortality Risk

In addition to those measures listed for mitigating effects on bird habitat availability, the following mitigation measures will be implemented to minimize Project environmental effects on bird mortality:

- Vehicle speeds along the ROW will be reduced.
- Line-markers or bird diverters will be placed on transmission wires over major river crossings (i.e., Red River).

Species-specific measures used to mitigate effects during Project construction and operation and maintenance include:

- Conduct grouse lek searches in grassland and pasture habitats if activities overlap with the grouse breeding period (March 15 to May 15).
- Comply with grouse lek setback guidelines if timing of activity overlaps with sensitive time periods (see Chapter 10).
- Install perch deterrents on transmission towers near sharp-tailed grouse leks to reduce predation by raptors.

9.6.5.4 Assessment of Changes in Bird Distribution

Table 9.6-6 summarizes Project-related changes in bird distribution on the bird KIs. These effects are discussed in detail for the construction and operation phases below.

Table 9.6-6: Changes in Bird Distribution as a Result of the Project

Key Indicator	Project Phase	
	Construction	Operation
Canada Goose	Habitat abandonment and disruption of daily movements	Habitat abandonment or avoidance during maintenance activities
Sharp-tailed Grouse	Avoidance or abandonment of leks	Lek abandonment during maintenance activities

9.6.5.5 Construction-related Effects

Clearing activities during construction of the Project was ranked as 2 for change to bird distribution. During these activities, noise will be generated from mowing, cutting and/or removal of vegetation in the ROW. Presence and movement of people and vehicles will also be a potential disturbance to birds. Dependent on activity and disturbance level, clearing activities will cause temporary and/or permanent displacement of birds through nest or territory abandonment, resulting in indirect habitat loss. Displacement of birds from noise disturbance also has the potential to cause alterations in foraging and anti-predator behavior. Anthropogenic noises can reduce distance from which signals, such as songs or calls for communication, territory establishment or defense, or audio cues indicating presence of predator or prey, can be perceived (Slabbekoorn and Ripmeester 2007; Barber et al. 2009).

The physical presence of humans and machinery could affect seasonal and daily movements of some species or individuals as they alter their pathways to avoid disturbance. Limited movement can prevent individuals from accessing resources and can hamper their ability to avoid predators (AltaLink Management Ltd. 2006). Most transmission line projects likely have little effect on seasonal movements, such as the spring and fall migrations of larger bird species, as most fly considerably higher than the height of transmission lines and any related construction activities on the ground (Gauthreaux 1972). The effect of sensory disturbance due to clearing are mitigated for most birds by restricting these activities during the breeding season.

Key Indicator Species – Canada Goose

Changes in distribution of Canada goose from clearing activities are anticipated to be limited to daily effects including habitat abandonment and disruption of daily movements through avoidance of the construction site. Any indirect Canada goose habitat loss resulting from Project construction sensory disturbance is not expected to have an effect at the population level.

Key Indicator Species – Sharp-tailed Grouse

Sharp-tailed grouse are known to avoid or abandon an established lek in response to habitat disturbances and therefore are highly susceptible to the effects of sensory disturbance resulting from Project clearing activities. Suitable lek habitat within the Project assessment areas is limited and sensory disturbance may cause indirect habitat loss, further increasing overall habitat loss for this species as a result of the Project.

9.6.5.6 Operation-related Effects

Project presence and vegetation management was ranked as 2 for change in bird distribution. The physical presence of towers could affect daily movements within the PDA and/or LAA of some birds as they alter their pathways to avoid the infrastructure.

During maintenance activities, noise will be generated from machines and equipment used to maintain infrastructure and ROW vegetation. These activities may indirectly result in habitat loss by causing temporary displacement of birds through nest or territory abandonment.

Key Indicator Species – Canada Goose

As Canada goose is not generally known to specifically demonstrate avoidance to transmission tower presence, sensory disturbance effects as a result of Project presence are anticipated to be limited to infrequent site abandonment and/or avoidance by a few individuals. Sensory disturbance from maintenance activities are anticipated to result in potential habitat or nest abandonment and disruption of daily movements through avoidance of the machinery and equipment. Any indirect Canada goose habitat loss resulting from Project operation sensory disturbance is not anticipated to have an effect at the population level.

Key Indicator Species – Sharp-tailed Grouse

If transmission towers are placed on or adjacent to a sharp-tailed grouse lek, there is the potential for this species to abandon the established lek in response to habitat disturbance. Not only does habitat fragmentation from transmission lines lead to higher rates of predation, but other grouse species (sage-grouse) have been shown to abandon lek sites due to predation, persistent disturbance and alteration of the vegetation structure (Patterson 1952; Graul 1980; Ellis 1987; Holloran 2005; Walker et al. 2007). Machinery and equipment used during maintenance may also cause site abandonment. Within the RAA, suitable lek habitat is limited and sensory disturbance during the breeding period could result in indirect habitat loss, further increasing overall habitat loss for this species as a result of the Project.

9.6.5.6.1 Mitigation for Change in Bird Distribution

In addition to those measures listed for mitigating effects on bird habitat availability and bird mortality, the following mitigation measures will be implemented to minimize Project environmental effects on change to bird distribution:

- 30-m vegetated buffers will be maintained around wetlands, streams and other river crossings.

- Sharp-tailed grouse lek searches will be conducted in grassland and pasture habitats when clearing and construction activities overlap with breeding timing window (March 15 to May 15).

9.6.5.7 Summary of Project Residual Environmental Effects on Birds

Table 9.6-7 below, summarizes the characterization and overall significance determinations of residual Project effects on birds. Overall, the individual Project effects on habitat availability, risk of mortality and distribution will be local and will affect only a small proportion of the regional bird populations.

9.6.5.8 Determination of Significance of Residual Environmental Effects

9.6.5.8.1 Change in Bird Habitat Availability

During construction, clearing activities will result in a direct loss of bird habitat. Land within the PDA will be disturbed by vegetation removal and soil disturbance as surfaces are prepared for drilling and tower installation. Loss of bird habitat resulting from operation activities will remain throughout the life of the Project as presence of transmission towers, and vegetation management along the ROW, will result in habitat loss through the duration of the Project. The Project is situated within a highly disturbed environment where land has been modified for agriculture and much of the original natural vegetation and bird habitat has been converted to other land uses. Construction and operation activities will result in the loss of some bird habitat types that are already limited in availability in the Project assessment areas. The effect of clearing activities and operation on bird habitat availability is characterized as being adverse, low in magnitude and restricted to the LAA. The effect will be continuous through the Project life and reversible. Given the limited extent of changes to bird habitat availability, the effect is not expected to causes changes in abundance and distribution of a species such that its population would no longer be secure in the RAA. The effect of the Project on bird habitat availability is assessed as being not significant.

Table 9.6-7: Summary of Project Residual Environmental Effects on Birds

Potential Residual Environmental Effects for the Project	Proposed Mitigation	Residual Environmental Effects Characteristics								Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Environmental Context	Significance	Likelihood of Significant Effects	
Change in Bird Habitat Availability										
Construction - Clearing	• 30-m vegetated buffers will be maintained around wetlands, streams and other river crossings. • Project construction and vegetation management activities will be restricted during the bird breeding and brood rearing period (See Table 10.3-1 for timing windows) • Project clearing activities in sharp-tailed grouse areas will be restricted from March 15 to May 15 if grouse leks present. • Sharp-tailed grouse lek searches will be conducted in grassland and pasture habitats if construction activities overlap with the grouse breeding period (March 15 to May 15).	A	M	L	MT/C	R	HD	N	N/A	General monitoring that EnvPP is being implemented appropriately

Table 9.6-7: Summary of Project Residual Environmental Effects on Birds

Potential Residual Environmental Effects for the Project	Proposed Mitigation	Residual Environmental Effects Characteristics								Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Environmental Context	Significance	Likelihood of Significant Effects	
	• Sharp-tailed grouse lek setback guidelines will be complied with. • Pre-construction nest searches will be carried out if clearing overlaps with Wildlife reduced risk timing windowsMaintain low woody vegetation along the ROW to enhance bird habitat.									
Change in Bird Mortality Risk										
Construction: Clearing	• Travel speeds along the ROW will be reduced	A	L	L	LT/I	R	HD	N	N/A	General monitoring that EnvPP is being implemented appropriately
Operation and Maintenance - Project Presence, Vegetation Management	• Place line-markers or bird diverters transmission wires over the Red River and potentially at other river crossings where bird collision risk is assessed to be high. • Place perch deterrents on transmission towers near sharp-tailed grouse leks and/or in grassland and pasture habitats.	A	M	L	MT/C	R	HD	N	N/A	Implement a bird mortality program to be carried out during Project operations.

Table 9.6-7: Summary of Project Residual Environmental Effects on Birds

Potential Residual Environmental Effects for the Project	Proposed Mitigation	Residual Environmental Effects Characteristics								Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Environmental Context	Significance	Likelihood of Significant Effects	
Change in Bird Distribution										
Construction - Clearing	• See mitigation outlined above for Change in Bird Habitat Availability	A	L	L	ST/C	R	HD	N	N/A	General monitoring that EnvPP is being implemented appropriately
Operation and Maintenance - Project Presence, Vegetation Maintenance	• 30 m vegetated buffers will be retained around wetlands, streams and other river crossings during vegetation management.	A	L	L	ST/I	R	HD	N	N/A	

KEY (Refer to Table 9.6-2 for definitions on the terms referenced below):

Direction: P: Positive; A: Adverse; N: Neutral

Magnitude: N: Negligible; L: Low; M: Moderate; H: High

Geographic Extent: L: Local- within the PDA/LAA; R: Regional - within the RAA

Duration: ST: Short-term; MT: Medium-term; LT: Long-term; P: Permanent – will not change back to original condition

Frequency: S: Single Event; I: Infrequent; F: Frequent; C: Continuous.

Reversibility: R: Reversible; I: Irreversible.

Ecological/Socio-economic Context: LD: Low disturbance; MD: moderate disturbance; HD: High-disturbance

Significance: S: Significant; N: Not Significant.

Likelihood of Significant Effect: Based on literature review and professional judgment. N/A: Not Applicable L: Low, M: Medium; H: High.

9.6.5.8.2 Change in Bird Mortality Risk

During construction, clearing activities have the potential to cause an increase to bird mortality from bird-vehicle collisions resulting from increased traffic levels of vehicles and equipment. The effect of clearing activities on bird mortality risk is characterized as being adverse, low in magnitude and restricted to the LAA. The effect will be restricted to the construction phase.

During the operation phase of the Project, bird mortality risk will potentially increase as a result Project presence and possibly through vegetation management activities along the ROW. The effect of Project operation activities on bird mortality risk is characterized as being adverse, moderate in magnitude and restricted to the LAA. The effect will be continuous through the operation phase and reversible. Mitigation methods to minimize the change in mortality risk to birds will limit the effects on bird mortality. Changes in abundance and distribution of a species such that its population would no longer be secure in the RAA are not expected. The effect of the Project on bird mortality is assessed as being not significant.

9.6.5.8.3 Change in Bird Distribution

During construction, clearing and drilling activities, as well as the presence of people and vehicles will result in sensory disturbance to birds. This disturbance has the potential to cause temporary and/or permanent displacement of birds through nest or territory abandonment. The effect of sensory disturbance to birds from construction activities is characterized as being adverse, low in magnitude and restricted to the LAA. The effect will be restricted to the construction phase and is considered reversible.

During Project operation, presence of the Project, as well as vegetation management activities will result in sensory disturbance to birds. The physical presence of towers could affect daily movements of some bird species or individuals as they alter their pathways to avoid disturbance. The effect of sensory disturbance to birds from operation activities is characterized as being adverse, low in magnitude and restricted to the LAA. The effect will occur throughout the operation phase and is considered reversible. Sensory disturbance to birds will be restricted to the LAA and is not expected to change the abundance and distribution of a species such that its population would no longer be secure in the RAA. The effect of the Project on sensory disturbance to birds is assessed as being not significant.

9.6.6 Cumulative Environmental Effects on Birds

This section consists of an evaluation of the effects of the Project on birds in combination with the effects of other projects or activities that will likely overlap spatially and temporally with those of the Project. The focus of this cumulative effects assessment is on those residual project effects identified in the section above. These effects are considered in relation to the past, current and reasonably foreseeable future projects and activities listed in the table below, to evaluate the potential for the effects from the Project to act cumulatively in a manner that could cause a change in the VC that will alter its status or integrity beyond an acceptable level, relative to the established threshold.

The potential for interaction between the effects of the Project on birds and the effects of other identified past, current and future projects and activities are presented in Table 9.6-8. Projects will have an interaction ranked as 0 if Project environmental effects do not overlap spatially and temporally with those of other projects and activities, and, therefore, do not have the potential to act cumulatively with those of other projects and activities. Interactions ranked as 1 are Project environmental effects that act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). Interactions ranked as 2 are those interactions where Project environmental effects act cumulatively with those of other projects and activities, and may exceed acceptable levels without the implementation of project-specific or regional mitigation.

Table 9.6-8: Potential Cumulative Environmental Effects on Birds

Other Projects and Activities with Potential for Cumulative Environmental Effects		**Potential Cumulative Environmental Effect**		
		Change in Bird Habitat Availability	**Change in Bird Mortality Risk**	**Change Bird Distribution**
Infrastructure Projects	PTH 59 Twinning	1	1	1
	PTH 52 Twinning	1	1	1
	PTH 75 Rehabilitation	0	0	0
Residential Projects	Sage Creek Residential Development	0	0	0
Energy Projects	Manitoba-Minnesota Transmission Project	1	1	1
	Bipole III Transmission Project	1	1	1
	St. Joseph Windfarm Project	1	1	1

KEY:

Cumulative environmental effects were ranked as follows:

0 = Project environmental effects do not act cumulatively with those of other projects and activities.

1 = Project environmental effects act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of beneficial management or codified practices.

2 = Project environmental effects act cumulatively with those of other projects and activities and the resulting cumulative effects may exceed acceptable levels without implementation of project-specific or regional mitigation.

9.6.6.1 Assessment of Cumulative Effects on Birds

9.6.6.1.1 Infrastructure Projects

Future infrastructure projects that will overlap spatially with the Project include the twinning of PTH 59 and PTH 52. PTH 59 runs south of Winnipeg and intersects with the proposed St. Vital to Letellier (V95L) transmission line route three times. Of the total length of PTH 59 that requires twinning, approximately 41 km cross the transmission line portion of the RAA and 12 km through the LAA. PTH 52 runs east from PTH 59 and intersects with the proposed St. Vital to Letellier (V95L) transmission line route once. Of the total length of PTH 52 that requires twinning, approximately 7 km cross the RAA, 2 km of which transect the LAA perpendicularly (Map 9-5). Loss of bird habitat, increase in bird mortality risk and change in bird distribution are all potential effects of this proposed project.

Residential Projects

Sited on an area of previously intensively cultivated agricultural land which provided little or no habitat for wildlife species, the Sage Creek residential development on the east side of Winnipeg consists primarily of residential housing. Any further development at Sage Creek will be incremental to the residential development that has already occurred. As such, no Project-related effects causing additional changes to bird habitat availability, mortality risk and distribution are anticipated to occur.

9.6.6.1.2 Energy Projects

Transmission

While the construction phases of the proposed Manitoba to Minnesota Transmission Project (MMTP) and the approved Bipole III Transmission Project (BPIII) are not anticipated to overlap temporally with the Project, there will be temporal overlap between other phases, including operations phases for all three projects. There will be spatial overlap between MMTP and BPIII and the Project. The BPIII project crosses the proposed Project ROW once, south of Niverville. This portion of the BPIII transmission route includes a crossing of the Red River and traverses mostly agricultural cropland. Agricultural cropland provides only marginal bird habitat and therefore potential effects to bird habitat and distribution are expected to be localized during the construction phase of the Project.

Increased bird mortality risk and sensory disturbance to birds are potential effects of the BPIII and MMTP projects and more likely to overlap during operation phases of these projects. Assuming effective project-specific mitigation is implemented for these projects, effects are expected to be localized and difficult to discern.

Route selection for MMTP is still in process. The proposed route options share the Southern Loop corridor with the Project, and traverse the Project RAA in the RM of Tache.

Wind-Energy

The St. Joseph Windfarm is located near St. Joseph, MB west of PTH 75, south of PTH 14 and north of PR 421. This windfarm consists of 60 2.3-MW turbines (Canwea 2008) and will overlap spatially and temporally with the Project RAA. The St. Joseph Windfarm is situated in an agricultural dominated landscape where most turbines have been placed on annual cropland. Bird habitat loss was not considered to be a significant effect of this project's construction (Helimax 2008).

Recent literature studies have shown that in Canada, windfarms result in lower bird mortality rates than transmission lines (Calvert et al. 2013; Zimmerling et al. 2013). National estimates suggest that on average, approximately 8.2 birds per turbine are killed as a result of turbine collision each year (Zimmerling et al 2013). On a national level for most species, this has been estimated to have an annual effect of less than 0.8% of any population.

9.6.6.2 Summary of Project Cumulative Environmental Effects on Birds

The total cumulative effect to birds consists of changes in bird habitat availability and bird distribution under project footprints and along ROW maintenance trails and roads in association with the energy (transmission projects and wind energy projects) and highway twinning projects. Cumulative effects to bird mortality risks stem from the direct mortality from wind turbine generators (WTGs) and vehicle and transmission line collisions. The overall magnitude of the change in these effects is considered low to moderate as the measureable change in bird populations and habitats within the context of the regional assessment area is small and relatively minor, due to the predominantly highly disturbed state of the landscape from agricultural practices. The changes to birds are considered reversible throughout the life of the projects considered. Although bird habitat availability and distributions in these areas will be altered during construction and bird mortality risk will increase with increased traffic, appropriate mitigation to avoid adverse effects on birds will be implemented. Project-related disturbance to habitats will be minimized and areas returned to pre-construction condition (to the extent possible), with the focus to maintain the function of vegetation (e.g., providing bird habitats). A summary of the characterization of the cumulative effects on bBirds, including the cumulative environmental effects with the Project and the Project contribution to cumulative effects, is presented in Table 9.6-9. The characterization of cumulative residual environmental effects are considered following the mitigation prescribed to minimize project effects, as well as any follow-up and monitoring recommended.

Cumulative effects to birds are not anticipated to result in environmental effects such that existing bird habitat availability, bird distribution and bird mortality risk will impair the viability of bird populations within the RAA and have therefore been rated not significant.

Table 9.6-9: Summary of Cumulative Residual Environmental Effects on Birds

Cumulative Environmental Effect and Project Contribution		Cumulative Residual Environmental Effects Characteristics						Significance	Likelihood of Significant Effect
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Ecological/Socio-Economic Context		
Change in Bird Habitat Availability	Cumulative Effect with Project	A	M	L	MT/C	R	HD	N	N/A
	Project Contribution to Cumulative Effect	A	L	L	MT/C	R	HD	N	N/A
Change in Bird Mortality Risk	Cumulative Effect with Project	A	L	L	LT/I	R	HD	N	N/A
	Project Contribution to Cumulative Effect	A	M	L	LT/I	R	HD	N	N/A
Change in Sensory Disturbances to Birds	Cumulative Effect with Project	A	L	L	ST	R	HD	N	N/A
	Project Contribution to Cumulative Effect	A	L	L	ST	R	HD	N	N/A

KEY:

Direction: P: Positive; A: Adverse; N: Neutral

Magnitude: N: Negligible; L: Low; M: Moderate; H: High

Geographic Extent: L: Local- within the PDA/LAA; R: Regional - within the RAA

Duration: ST: Short-term; MT: Medium-term; LT: Long-term; P: Permanent – will not change back to original condition

Frequency: S: Single Event I: Infrequent; F: Frequent; C: Continuous.

Reversibility: R: Reversible; I: Irreversible.

Ecological/Socio-economic Context: LD: Low-disturbance; MD: Moderate-disturbance HD: High-disturbance

Significance: S: Significant; N: Not Significant.

Likelihood of Significant Effect: Based on literature review and professional judgment. N/A: not applicable; L: Low, M: Medium; H: High.

9.6.7 Follow-up and Monitoring

Bird mortality, as a result of transmission line collisions and/or electrocutions, will be monitored at high risk areas in order to assess mortality risk to birds from transmission lines and towers.

9.6.8 Summary

The mitigation measures presented in Sections 9.6.3.4.3, 9.6.3.5.3 and 9.6.3.6.3 to minimize effects on birds can be summarized in Manitoba Hydro's commitment to:

- Use general mitigation measures as outlined in Chapter 10.
- Develop an Environmental Protection Plan (EnvPP) with provisions outlining guidelines and practices from applicable regulators, and adequately designed mitigation measures.
- Contractor developed Emergency Response Plan that includes spill response procedures.

9.7 WILDLIFE: MAMMALS

Mammals include rodents, fur-bearers, ungulates and carnivores. They are linked to various other VCs through the food chain as the group includes herbivores, carnivores and scavengers. Mammals was selected as a VC due to their importance to resource users within the regional assessment area (RAA) as well as their ecological importance.

Mammals, as a species group whose mobility and life histories mean that they live year-round in the RAA, may experience environmental effects from the Project. Activities related to the construction, operation and maintenance of the Project will have direct and/or indirect effects on some mammals and mammal habitat. The assessment of potential effects on mammals focused primarily on habitat availability for Key Indicators (KIs as the presence of habitat directly influences the ability of an area to support mammals.

9.7.1 Scope of Assessment for Mammals

9.7.1.1 Regulatory Setting

Regulation 3/96 within the Manitoba *Wildlife Act* covers certain "Designated Wild Animals" including several species of bats, grizzlies, muskoxen, and swift fox. With the exception of a few species of mammals listed under the *Wildlife Act* and/or MESA, there are no regulatory guidelines for mammals in Manitoba.

9.7.1.2 Boundaries

The temporal boundaries for the assessment of potential effects of the Project on mammals include the duration of Project construction, operation and maintenance periods; see Section 3.7 for the Project construction schedule. Operation and maintenance of the Project will begin following construction and will be carried out until project decommissioning. The potential for Project environmental effects will peak during construction, and will diminish during operation and maintenance. The majority of the mammal species that utilize habitats within the Project assessment areas occupy the local area year-round. As such, Project effects will include the breeding, summer forage, and over-wintering habitats.

The spatial boundaries for the environmental effects assessment of mammals are as follows:

Project Development Area (PDA): The PDA for mammals includes the area within which all physical construction activities associated with the Project will take place. The PDA includes 119 km of transmission line between St. Vital Station and Letellier Station, and 37 km of transmission line between St. Vital Station and La Verendrye Station, and upgrades at the station sites (Map 9-5). For the purposes of this assessment, a 40 m ROW was used.

Local Assessment Area (LAA): The LAA for mammals is a 2 km wide corridor (extending 1 km on either side of the ROW centreline) encompassing the PDA (Map 9-5).

Regional Assessment Area (RAA): The RAA for mammals includes a 10-km-wide corridor (extending 5 km on either side of the ROW centreline) encompassing the PDA (Map 9-5).

As indicated in Section 9.6.1.2, the Forest Management Guidelines for Terrestrial Buffers (Manitoba Conservation 2010) and Saskatchewan Activity Restriction Guidelines (Ministry of Environment 2013) provide the basis for administrative and technical boundaries for changes in mammal mortality and mammal habitat availability.

9.7.1.3 Identified Issues and Concerns

The public engagement activities, including stakeholder workshops and First Nations engagement, revealed the importance of natural resource use by First Nations groups and others; this includes hunting of ungulates, and trapping of furbearers.

9.7.2 Project Interactions with Mammals

Table 9.7-1 ranks the potential of an environmental effect on mammals to result from interactions between the environment and Project activities. Further assessment of residual environmental effects is based on the rating value assigned in this table.

Table 9.7-1: Potential Project Environmental Effects on Mammals

Project Activities and Physical Works	Potential Environmental Effect	
	Change in Mammal Mortality	Change in Mammal Habitat Availability
Construction:		
Clearing	1	2
Drilling	0	0
Marshalling Yards	1	1
Tower Installation	1	1
Stringing Conductors	0	0
Presence of Materials and Equipment	1	1
Site Reclamation	0	0
Operation and Maintenance:		
Project Presence	1	1
Maintenance of Infrastructure	1	1
Vegetation Management	1	2

KEY:

Project-related Environmental Effects were ranked as follows:

0 = No interaction.

1 = Interaction may occur; however, based on past experience and professional judgment, the resulting environmental effect is well understood and can be managed to acceptable levels through General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). No determination of significance of residual effects or cumulative effects assessment is warranted.

2 = Interaction may occur and the resulting environmental effect may exceed acceptable levels without implementation of project-specific mitigation.

9.7.2.1 Justification and Rationale for Interactions Ranked as 1

The effects of interactions rated 1 are expected to have non-substantive interaction with the Mammal VC or are expected to be managed to acceptable levels through the planned implementation of well-established and proven mitigation and the implementation of general environmental protection measures as outlined in Chapter 10. The rationale for ranking interactions as 1 is discussed below. Assessment of interactions ranked 2 occur in Section 9.7.5 below.

During Construction, clearing has been ranked as 1 for changes in mammal mortality. Land contained within the PDA will be disturbed by vegetation removal and soil disturbance. This activity may result in direct mortality for some small mammals, particularly those who reside in burrows in the soil, or those who reside in tree hollows in forested bluffs.

Construction of marshalling yards and installation of towers have both been ranked as 1 for changes in mammal mortality and changes in mammal habitat availability. Both activities have the potential to result in mammal mortality to American badger as well as other mammals due to increased road traffic resulting in vehicle-related mortality, and the potential for collapse of burrows. Both activities will permanently remove a small portion of habitat from use by mammals.

Presence of equipment and materials has been ranked as 1, and has the potential to interact with mammal populations. Potential environmental effects are limited to indirect environmental effects such as noise associated with heavy machinery and truck traffic, which will be temporary and limited in magnitude. Locations of storage of excavated material and aggregates, as well as potentially hazardous materials will be chosen such that sensitive areas and habitats are avoided. The use of general mitigation measures (outlined in Chapter 10) will limit the interaction between mammal populations and construction activities such that potential effects to mammal mortality and habitat availability above baseline conditions will not be discernible.

Increased traffic during reclamation may result in a small, short-term increase in mammal mortality events. Localized, short-term sensory disturbance will occur during reclamation. Traffic and sensory disturbance may also cause avoidance of certain areas, resulting in small, short-term habitat availability loss. In general, any potentially negative effects to mammal mortality and habitat availability will be minimal with the appropriate implementation of general mitigation measures (as outlined in Chapter 10). Marshalling areas and construction sites that are reclaimed to previous conditions can potentially provide additional mammal habitat availability that was temporarily lost during construction activities providing an overall potential positive effect.

During the operations and maintenance phase of the Project, presence of the Project, maintenance of infrastructure and vegetation maintenance have been ranked as 1 for potential effects to mammal mortality. These interactions have the potential to effect mammal populations through vehicular collisions from increased line maintenance traffic and the operation of ROW mowing equipment. Implementation of general mitigation measures (as outlined in Chapter 10) will limit potential effects to mammal mortality resulting from vehicular collisions such that effects above baseline conditions will not be discernible.

Potential effects causing changes to mammal habitat availability resulting from Project presence and maintenance of infrastructure have been ranked as 1. The presence of a perceived linear barrier (where the line bisects forested or riparian areas) and noise from line maintenance equipment has the potential to limit the use of available habitat by certain mammalian species. Indirect potential negative environmental effects associated with Accidents, Malfunctions, and Unplanned Events and are discussed in Section 9.19.

9.7.2.2 Selection of Key Indicators

The selected key indicator for the assessment of environmental effects on mammals was white-tailed deer. White-tailed deer were chosen because they are valued by people for hunting and wildlife watching. They are relatively plentiful in the Project area and can be at risk from Project activities such as increased traffic.

9.7.2.3 Selection of Environmental Effects and Measurable Parameters

The environmental assessment of mammals is focused on the following environmental effects:

- Change in Habitat Availability

Table 9.7-2 presents the measureable parameters used for assessing the effects of the Project on mammals. These measurable parameters were based on the professional judgment of the Study Team.

Table 9.7-2: Measurable Parameters for Mammals

Environmental Effect	Measurable Parameter	Rationale for Selection of Measurable Parameter
Change in Habitat Availability	Changes in extent (ha) of critical reproductive and overwintering habitats; core security habitat (i.e. thermal and concealment cover	Provides a quantifiable measure to determine loss or exclusion from natural habitat which is already limited within the RAA due to pre-existing development.
	Changes in noise/light levels	Provides a quantifiable measure to determine alteration of existing habitat resulting from the presence of equipment and personnel, especially at night and during critical timing windows.

9.7.3 Residual Environmental Effects Description Criteria

Parameters listed in Table 9.7-3 are used to characterize and evaluate residual environmental effects of the Project on mammals.

Table 9.7-3: Characterization of Residual Environmental Effects for Mammals

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	Changes in mammal habitat availability	**Positive** – an increase in mammal habitat availability within the RAA or LAA
		Adverse – a decrease in mammal habitat availability within the RAA or LAA
		Neutral – no net change in mammal habitat availability within the RAA or LAA
Magnitude	The amount of change in a measurable parameter or variable relative to the baseline case.	**Negligible** – no measurable change in mammal habitat availability in the RAA or LAA
		Low – a very small measurable change in mammal habitat availability in the RAA or LAA
		Moderate – a measurable change to mammal habitat availability in the RAA or LAA but not affecting species security
		High – a measurable change to mammal habitat availability in the RAA or LAA that affects species security
Geographical Extent	The geographic area within which the environmental effect of a defined magnitude occurs	**PDA/LAA** – loss/change in mammal habitat availability is restricted to the PDA/LAA
		RAA – loss/change in mammal habitat availability extends into the RAA
Timing and Frequency	Effect to mammal habitat may occur from construction activities and/or project operation	**Once** – effect considered to be a one-time event
		Infrequent –effects considered to likely occur a few times per year (e.g., tower maintenance and vegetation management)
		Frequent – effects considered to likely occur more than a few times per year
		Continuous – effects considered to occur for the life of the Project (construction through decommissioning)
Duration	Length of time for habitat to revert to pre-project conditions	**Short-term** – effects will be restricted to construction phase

Table 9.7-3: Characterization of Residual Environmental Effects for Mammals

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		Medium-term – effects will continue through operational phase
		Long-term – effects will continue past project decommissioning
		Permanent – effects will be evident and measurable parameters will be unlikely to recover to baseline conditions
Reversibility	Likelihood that mammal habitat will recover from project construction and operation	**Reversible** – mammal habitat will recover after project decommissioning
		Irreversible – effects to mammal habitat are permanent
Ecological and Socio-economic Context	The Project is located predominantly on agricultural land, with some pasture	**Low-disturbance -** land supports large, intact areas of mammal habitat
		Moderate-disturbance - land has been modified for agriculture and/or human development yet supports some large areas of mammal habitat
		High-disturbance – land has been highly modified for agriculture and much of the original mammal habitat has been converted to other land uses
Likelihood of Significant Effect	The likelihood that mammal habitat will be significantly affected	**Low** – a low likelihood that there will be significant effects to mammal habitats
		Medium – a medium likelihood that there will be significant effects to mammal habitats
		High – a high likelihood that there will be significant effects to mammal habitats

9.7.3.1 Significance Thresholds for Residual Environmental Effects

No defined regulatory thresholds exist for white-tailed deer or any other mammal expected to occur within the RAA. A significant residual adverse environmental effect on mammals is defined as a Project-related environmental effect that results in a decline in abundance or change in distribution of common and secure population(s) such that populations will not be secure within the RAA.

9.7.4 Existing Conditions for Mammals

9.7.4.1 Baseline Data Sources

A search of the Manitoba Conservation Data Centre database returned no results of previously recorded observations of at risk mammal species within the Project area. On October 2, 2013, a driving survey of the Project area was conducted, and riparian areas were visually inspected on foot. Evidence of white-tailed deer (scat, tracks) was common along waterways and along infrequently travelled roads where wooded bluffs were in close proximity.

9.7.4.2 Baseline Overview

White-tailed deer are very adaptable to human presence. They occur in abundance throughout the Prairie and Boreal Plains Ecozones (Smith et al 1999). Abundant food makes almost any grassland, forested or tall shrubby area suitable for white-tailed deer during the summer, though in summer they are predominantly grazers (Hirth 1977). As snow deepens in the winter, the deer gather in small groups in mixed deciduous forested areas that provide winter forage and shelter. If wintering habitat is not immediately available near the summer range, an autumn migration of 10 to 50 km may occur (Marchinton and Hirth 1984) Throughout the RAA, such migrations are rarely necessary as the area is a mosaic of grasslands and deciduous forest.

9.7.5 Project Environmental Effects on Mammals

Only the interactions ranked as 2 in Table 9.7-5 were considered further in the assessment of Project-related environmental effects.

9.7.5.1 Analytical Methods

Assessment of residual environmental effects of the Project on mammals was largely focused on types of habitat affected by the Project and the potential of these habitats to support various mammal groups and key indicator species (i.e., white-tailed deer). Federal Land Cover Classification data for the Project was consulted (Government of Canada 2009) to establish baseline availability of preferred KI habitat types within the assessment areas. These preferred habitats were identified and mapped within the RAA based on literature available regarding habitat selection preferences for white-tailed deer.

The federal land cover classification data (Government of Canada 2009) was then used to calculate the potential loss and/or alteration of suitable habitat associated with Project development. The potential for Project activities to affect various mammal habitat types, and therefore mammal communities, determined how residual Project environmental effects were characterized.

9.7.5.2 Assessment of Changes in Mammal Habitat Availability

Table 9.7-4 summarizes the effects of the Project on mammal habitat availability for the key indicator species.

Table 9.7-4: Changes in Mammal Habitat Availability as a Result of the Project

Key Indicator	Project Phase	
	Construction	Operation
White-tailed Deer	Minimal habitat loss	Loss or alteration of riparian habitat resulting from vegetation management
	Negligible loss of foraging habitat (cropland, grassland)	

9.7.5.2.1 Construction-Related Effects

During construction, clearing activities have been ranked as 2 for changes in mammal habitat availability. For this activity, land within the Project footprint will be disturbed by vegetation removal and soil disturbance as surfaces are prepared for drilling and tower installation. Clearing activities will result in direct loss and/or fragmentation of mammal habitat. Magnitude of the effect of clearing activities is dependent soil types and vegetation cover transected by the proposed routes, and the foraging, thermal cover, and denning activities those areas may support.

Annual cropland and developed areas provide marginal mammal habitat for some mammals while treed, grassland and wetland land cover types provide more productive mammal habitats for a diversity of species. High-quality wildlife habitat was a criterion in the routing process which was weighted against other criteria attempting to minimize overall effects. Planned mitigation measures will further assist in minimizing the effects of construction-related activities on habitat availability.

Modifications to the existing St. Vital, La Verendrye and Letellier stations will occur within the fenced station sites. As such, there are no change in mammal habitat availability due to these activities are expected to occur.

Key Indicator Species – White-tailed Deer

Land clearing during the construction phase will disrupt and/or fragment potential white-tailed deer habitat within the LAA. Close to 24% of the total length of the La Verendryre to St. Vital (Y36V) route will be intersecting grassland and pasture land cover and 2% will be transecting deciduous forest, while 9% the St. Vital to Letellier (V95L) route will be intersecting grassland and pasture and 1.5% will intersect deciduous and shrub land cover types.

9.7.5.2.2 Operation-Related Effects

Vegetation management during project operation was ranked as 2 for changes to mammal habitat availability as there will be direct habitat loss resulting from Project infrastructure. Vegetation management techniques along the ROW could also result in changes to habitat structure and availability.

The St. Vital, Letellier and La Verendrye stations will continue to operate as they currently do during the operations and maintenance phases of the Project, therefore no change in mammal habitat availability due to station operations are expected to occur.

Key Indicator Species – White-tailed Deer

While suitable forage habitat is available throughout the LAA, wooded bluffs utilized by white-tailed deer for winter foraging, predator avoidance and thermal cover are limited within the Project assessment area. As a result of the Project presence, approximately 89 ha of this habitat will be lost.

9.7.5.2.3 Mitigation for Project Effects on Mammal Habitat Availability

General mitigation measures used to mitigate effects on mammal habitat during Project construction and operation include:

- A 30 m vegetated buffer will be retained around wetlands, streams and other river crossings.

9.7.5.2.4 Summary of Project Residual Environmental Effects on Mammals

Table 9.7-5 below, summarizes the residual Project effects on mammals. Overall, Project effects on mammal habitat availability will be adverse, low in magnitude, local, and long-term yet reversible.

Table 9.7-5: Summary of Residual Project Effects on Mammals

Potential Residual Environmental Effects for the Project	Proposed Mitigation	Residual Environmental Effects Characteristics								Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Ecological Context	Significance	Likelihood of Significant Effect	
Change in Mammal Habitat Availability										
Construction - Clearing	• Establish buffers and protect active mammal dens. • Include any SAR or SOCC found within or adjacent to the PDA in post-construction monitoring and follow-up plans. • Keep litter and garbage contained. • Limit the extent of clearing in important habitats, such as riparian areas and wetlands, when feasible. • Flag off environmentally sensitive areas prior to site clearing and construction. • Limit Project-related activity outside of the PDA. • Use designated roadways and access roads.	A	L	L	LT/C	R	HD	N	N/A	No specific monitoring for mammals is currently planned beyond general monitoring that the EnvPP is being implemented appropriately

Table 9.7-5: Summary of Residual Project Effects on Mammals

Potential Residual Environmental Effects for the Project	Proposed Mitigation	Residual Environmental Effects Characteristics								Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Ecological Context	Significance	Likelihood of Significant Effect	
Operation and Maintenance - Vegetation Management	• Follow Project-specific EnvPP	A	L	L	ST/I	R	HD	N	N/A	

KEY (Refer to Table 9.7-3 for definitions on the terms referenced below):

Direction: P: Positive; A: Adverse; N: Neutral

Magnitude: N: Negligible; L: Low; M: Moderate; H: High

Geographic Extent: L: Local- within the PDA/LAA; R: Regional - within the RAA

Duration: ST: Short-term; MT: Medium-term; LT: Long-term; P: Permanent – will not change back to original condition

Frequency: S: Single Event; I: Infrequent; F: Frequent; C: Continuous.

Reversibility: R: Reversible; I: Irreversible.

Ecological/Socio-economic Context: LD: Low disturbance; MD: moderate disturbance; HD: High-disturbance

Significance: S: Significant; N: Not Significant.

Likelihood of Significant Effect: Based on literature review and professional judgment. N/A: Not Applicable L: Low, M: Medium; H: High.

9.7.5.3 Determination of Significance of Residual Environmental Effects

Clearing activities within the PDA will result in the long-term loss or alteration of 0.3% (90 ha) of available white-tailed deer habitat within the RAA. Based on the mitigation measures proposed and the small amount of habitat affected (relative to what is available within the RAA), the Project is not anticipated to affect the security of mammal populations inhabiting the RAA, including white-tailed deer and therefore, potential effects are rated as not significant.

9.7.6 Cumulative Environmental Effects on Mammals

This section consists of an evaluation of the effects of the Project on mammals in combination with the effects of other projects or activities that will likely overlap spatially and temporally with those of the Project. The focus of this cumulative effects assessment is on those residual project effects identified in the section above. These effects are considered in relation to the past, current and reasonably foreseeable future projects and activities listed in the table below, to evaluate the potential for the effects from the Project to act cumulatively in a manner that could cause a change in the VC that will alter its status or integrity beyond an acceptable level, relative to the established threshold.

The potential for interaction between the effects of the Project on mammals and the effects of other identified past, current and future projects and activities are presented in Table 9.7-6. Projects will have an interaction ranked as 0 if Project environmental effects do not overlap spatially and temporally with those of other projects and activities, and, therefore, do not have the potential to act cumulatively with those of other projects and activities. Interactions ranked as 1 are Project environmental effects that act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). Interactions ranked as 2 are those interactions where Project environmental effects act cumulatively with those of other projects and activities, and may exceed acceptable levels without the implementation of project-specific or regional mitigation.

Table 9.7-6: Potential Cumulative Environmental Effects on Mammals

Other Projects and Activities with Potential for Cumulative Environmental Effects		Potential Cumulative Environmental Effect
		Change in Habitat Availability
Infrastructure Projects	PTH 59 Twinning	1
	PTH 52 Twinning	1
	PTH 75 Rehabilitation	0
Residential Projects	Sage Creek Residential Development	0
Energy Projects	Manitoba-Minnesota Transmission Project	1
	Bipole III Transmission Project	1
	St. Joseph Windfarm Project	1

KEY:

Cumulative environmental effects were ranked as follows:

0 = Project environmental effects do not act cumulatively with those of other projects and activities.

1 = Project environmental effects act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of beneficial management or codified practices.

2 = Project environmental effects act cumulatively with those of other projects and activities and the resulting cumulative effects may exceed acceptable levels without implementation of project-specific or regional mitigation.

9.7.6.1 Assessment of Cumulative Effects on Mammals

9.7.6.1.1 Infrastructure Projects

Future infrastructure projects that will overlap spatially with the Project include the twinning of PTH 59 and PTH 52. PTH 59 runs south of Winnipeg and intersects with the proposed St. Vital to Letellier (V95L) route 3 times. Of the total length of PTH 59 that requires twinning, approximately 41 km cross the transmission line portion of the RAA and 12 km through the LAA. PTH 52 runs east from PTH 59 and intersects with the proposed St. Vital to Letellier (V95L) route once. Of the total length of PTH 52 that requires twinning, approximately 7 km cross the RAA, 2 km of which transect the LAA perpendicularly (Map 9-5). Changes to mammal habitat availability is a potential effect of these proposed projects.

Similar to the Project transmission lines, both PTH 59 and PTH 52 cross highly disturbed landscapes where agricultural cropland is the predominant land cover type. Agricultural cropland provides limited mammal habitat and therefore cumulative habitat loss resulting from twinning of the highways and the Project is not expected to be discernable.

Residential Projects

Sited on an area of previously intensively cultivated agricultural land which provided little or no habitat for any wildlife species, the Sage Creek residential development on the eastside of Winnipeg consists primarily of residential housing. Any further development at Sage Creek will be incremental to the residential development that has already occurred. As such, no Project-related effects causing additional changes to mammal habitat availability are anticipated to occur

9.7.6.1.2 Energy Projects

Transmission

Construction and operation of the Manitoba to Minnesota Transmission Project (MMTP) and Bipole III (BPIII) Transmission Project may overlap temporally and spatially with the Project. The BPIII project crosses the Project ROW once, south of Niverville, and traverses the width of the RAA (10 km). This portion of the BPIII transmission route includes crossing the Red River and mostly agricultural cropland. Route selection for MMTP is still under review; one proposed option may run parallel to the RAA eastern edge while other route options are located several kilometres east of the RAA. Changes in mammal habitat availability are potential effects of the these projects.. Assuming effective project-specific mitigation is implemented for these projects, effects are expected to be localized and not discernable to local mammal populations.

Wind-Energy

The St. Joseph Windfarm is located near St. Joseph, MB west of PTH 75, south of PTH 14 and north of PR 421. This windfarm consists of 60 2.3-MW turbines (Canwea 2008) and will overlap spatially and temporally with the Project RAA. The St. Joseph Windfarm is situated in an agricultural dominated landscape where most turbines have been placed on annual cropland. Mammal habitat loss was not considered to be a significant effect of this project’s construction (Helimax 2008). Potential cumulative habitat loss resulting from this windfarm and the Project is not considered discernable above baseline conditions.

9.7.6.2 Summary of Project Cumulative Environmental Effects on Mammals

The total cumulative effect to mammals consists of changes in mammalian habitat availability under project footprints and along ROW maintenance trails and roads in association with the energy (transmission projects and wind energy projects) and highway twinning projects. The overall magnitude of the change in these effects is considered low as the measureable change in mammalian habitats within the context of the regional assessment area is small and relatively minor, due to the predominantly highly disturbed state of the landscape from agricultural practices within the regional assessment area. The changes to mammals are considered reversible throughout the life of the projects considered. Although mammalian habitat availability in these areas will be altered during construction, appropriate mitigation to avoid adverse effects on mammals will be implemented. Project-related disturbance to habitats will be minimized and areas returned to pre-construction condition (to the extent possible), with the focus to maintain the function of vegetation (e.g., providing mammal habitats). The project contribution to total cumulative effects considering effects to mammalian habitat availability is relatively small and when compared to the permanent land lost and increased traffic through infrastructure projects (i.e., highway twinning) in relation to the agricultural land within the RAA. A summary of the characterization of the cumulative effects on mammals, including the cumulative environmental effects with the project and the project contribution to cumulative effects, is presented in Table 9.7-7. The characterization of cumulative residual environmental effects are considered following the mitigation prescribed to minimize project effects, as well as any follow-up and monitoring recommended.

Residual cumulative environmental effects of changes to mammal habitat availability, as a result of present and foreseeable future projects, have been deemed as not significant to regional mammal populations.

Table 9.7-7: Summary of Cumulative Residual Environmental Effects on Mammals

Cumulative Environmental Effect and Project Contribution		Cumulative Residual Environmental Effects Characteristics						Significance	Likelihood of Significant Effect
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Ecological/Socio-Economic Context		
Change in Habitat Availability	Cumulative Effect with Project	A	L	L	LT/C	R	HD	N	N/A
	Project Contribution to Cumulative Effect	A	L	L	LT/C	R	HD	N	N/A

KEY:

Direction: P: positive; A: adverse; N: Neutral

Magnitude: N: Negligible; L: Low; M: Moderate; H: High

Geographic Extent: L: Local- within the PDA/LAA; R: Regional - within the RAA

Duration: ST: Short-term; MT: Medium-term; LT: Long-term; P: Permanent – will not change back to original condition

Frequency: S: Single Event C: Continuous.

Reversibility: R: Reversible; I: Irreversible.

Ecological/Socio-economic Context: U: Undisturbed H: Highly disturbed

Significance: S: Significant; N: Not Significant.

Likelihood of Significant Effect: Based on literature review and professional judgment. L: Low, M: Medium ; H: High, N/A: not applicable.

9.7.7 Follow-up and Monitoring

There is no follow-up or monitoring planned for mammals, beyond general monitoring that the EnvPP is being implemented as planned.

9.7.8 Summary

The widespread alteration of the natural habitat throughout the Prairie and Boreal Plains Ecozones has resulted in diminished populations and ranges of many mammals. As a result, mammals like white-tailed deer that inhabit the RAA are well-adapted to altered landscapes. Important wildlife habitat in the RAA consists of riparian areas, a few scattered woodlots and wetlands. General mitigation measures outlined in Chapter 10 will serve to minimize project effects.

Construction of the Project will result in minimal effects on mammals during the construction period. During Project operations, little or no effect on mammals is anticipated.

9.8 SPECIES OF CONSERVATION CONCERN (SOCC)

Species of conservation concern (SOCC) include a diverse group of bird, amphibian and mammal species that have been experiencing population declines across all or parts of their range. SOCC were selected as a VC because of their regulatory importance and vulnerability to changes in habitat.

Activities related to the construction, operation and maintenance of the Project will have direct and/or indirect effects on SOCC. The assessment of potential effects focused on habitat availability as the presence of habitat directly influences the ability of an area to support specific SOCC. This, in turn, influences the diversity and abundance of SOCC in the Project assessment areas. Project effects are anticipated to be concentrated within the breeding season of those SOOC inhabiting and utilizing habitats within the assessment areas.

9.8.1 Scope of Assessment for SOCC

9.8.1.1 Regulatory Setting

The assessment of the potential environmental effects of the proposed Project on SOCC includes a consideration of species and their associated habitats that are listed under various federal and provincial acts and regulations (Section 9.5.2), including the following:

- *The Wildlife Act* (1987; Manitoba)
- *Manitoba Endangered Species Act* (1998; MESA)
- Federal *Species at Risk Act* (2002; SARA)

- *Migratory Bird Convention Act* (1994; MBCA)

9.8.1.2 Boundaries

The temporal boundaries for the assessment of potential effects of the Project on SOCC include the duration of Project construction, operation and maintenance periods; see Section 3.7 for the Project construction schedule. Operation and maintenance will continue until project decommissioning. The potential for Project environmental effects will peak during construction, but will diminish during operation and maintenance.

The spatial boundaries for the environmental effects assessment of SOCC are as follows:

Project Development Area (PDA): The PDA for SOCC includes the area within which all physical construction activities associated with the Project will take place. The PDA includes 119 km of transmission line between St. Vital Station and Letellier Station, and 37 km of transmission line between St. Vital Station and La Verendrye Station, and upgrades at the station sites (Map 9-5). For the purposes of this assessment, a 40 m ROW was used.

Local Assessment Area (LAA): The LAA for SOCC is a 2 km-wide corridor (1 km buffer on either side of the ROW centreline) encompassing the PDA (Map 9-5).Sensory disturbance from Project-related traffic and construction noise is not expected to have an effect on wildlife beyond 1 km of the PDA (Ruddock and Whitfield 2007).

Regional Assessment Area (RAA): The RAA for SOCC includes a 10 km-wide corridor (5 km buffer on either side of the ROW centreline) encompassing the PDA (Map 9-5).The buffer was limited to 5 km to reduce the effect of the City of Winnipeg being located adjacent to the La Verendryre to St. Vital (Y36V) route and the northern portion of the St. Vital to Letellier (V95L) route. This large urban area was considered to be a confounding factor when assessing this predominantly rural project.

The following administrative boundaries apply to the assessment of SOCC:

Federal Activity Restriction Guidelines

Environment Canada is responsible for conserving biodiversity, protecting species at risk and preserving wildlife habitat. Environment Canada and the Canadian Wildlife Service have developed Petroleum Industry Activity Guidelines for Wildlife Species at Risk in the Prairie and Northern Region (Environment Canada 2009) which provide timing restrictions and set-back distances from known locations of species at risk (Table 9.8-1). The effects assessment outlines these measures required for species listed under SARA, Schedule 1 and/or COSEWIC. As the province of Manitoba does not have specific activity restriction guidelines for wildlife species at risk or recognized as rare in the province, these federal guidelines will be followed for listed and rare species of wildlife expected to occur in the RAA.

Table 9.8-1: Timing Restrictions and Setback Distances From Known Locations of SOCC

SOCC	Timing Restriction	Setback Distances for High-Level Disturbance Developments
Short-Eared Owl Nests	March 25 – August 1	500 m
Northern Leopard Frog	Year Round	100 m
American Badger	N/A	N/A

Sources:
Environment Canada (2009)

9.8.1.3 Identified Issues and Concerns

None of the concerns or issues raised during the public engagement process (i.e., stakeholder workshops and public open house events) related to SOCC.

9.8.2 Project Interactions with SOCC

Table 9.8-2 ranks the potential of an environmental effect on SOCC to result from interactions between Project activities and physical works and the environment. Further assessment of residual environmental effects is based on the rating value assigned in this table.

Table 9.8-2: Potential Project Environmental Effects on SOCC

Project Activities and Physical Works	Potential Environmental Effect		
	Change in SOCC Habitat Availability	Change in SOCC Distribution	Change in Mortality Risk
Construction:			
Clearing	2	2	2
Drilling	0	2	1
Marshalling Yards	1	1	1
Tower Installation	1	1	1
Stringing Conductors	0	0	0
Presence of Materials and Equipment	1	1	1
Site Reclamation	1	0	0

Table 9.8-2: Potential Project Environmental Effects on SOCC

Project Activities and Physical Works	Potential Environmental Effect		
	Change in SOCC Habitat Availability	Change in SOCC Distribution	Change in Mortality Risk
Operation and Maintenance:			
Project Presence	2	2	2
Maintenance of Infrastructure	0	1	1
Vegetation Management	2	2	2

KEY:

Project-related Environmental Effects were ranked as follows:

0 = No interaction.

1 = Interaction may occur; however, based on past experience and professional judgment, the resulting environmental effect is well understood and can be managed to acceptable levels through General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). No determination of significance of residual effects or cumulative effects assessment is warranted.

2 = Interaction may occur and the resulting environmental effect may exceed acceptable levels without implementation of project-specific mitigation.

9.8.2.1 Justification and Rationale for Interactions Ranked as 1

The effects of interactions rated 1 are expected to have non-substantive interaction with the SOCC VC or are able to be managed to acceptable levels through the planned implementation of well-established and proven mitigation. The rationale for ranking interactions as 1 is discussed below. Assessment of interactions ranked 2 occur in Section 9.8.5.

During construction, the creation of marshalling yards, tower installation, and the presence of equipment and materials have the potential to cause changes in SOCC habitat availability, mortality risk and distribution. These activities will temporarily or permanently remove a small portion of habitat from use by SOCC. Placement of marshaling yards and towers within previously developed land cover types will minimize the amount of SOCC habitat lost. Changes in mortality risk to SOCC may be experienced through increased traffic at these sites.

Drilling activities during construction has the potential to cause changes in SOCC mortality through increased vehicular traffic. This potential effect is expected to be localized and temporary. As drilling activities are anticipated to take place in previously cleared (where necessary) areas, the number of SOCC mortalities associated with the increased traffic is not expected to be distinguishable from baseline levels.

Site reclamation activities during construction have the potential to cause changes in SOCC habitat through the restoration of disturbed areas to near pre-disturbance condition. Increased traffic may cause avoidance of certain areas, resulting in a small, short-term habitat loss. Overall, reclamation activities are expected to reduce the amount of overall habitat lost as a result of the Project and in areas of grassland/shrubland is anticipated to have a long-term, positive effect on some SOCCs.

During operation and maintenance of the Project, maintenance of infrastructure has the potential to effect changes in SOCC mortality and SOCC distribution. This interaction has the potential to effect SOCC mortality risk through vehicular collisions from increased line maintenance traffic and the operation of ROW mowing equipment. Implementation of general mitigation measures (as outlined in Chapter 10) will limit potential effects to SOCC mortality resulting from vehicular collisions such that effects above baseline conditions will be undiscernible.

9.8.2.2 Selection of Key Indicators

The KIs selected in this assessment are representative of SOCC (i.e., grassland species) that could potentially be affected by the Project. Short-eared owl is a migratory species that requires large (> 28 ha) open grassland habitats for breeding and foraging (Holt and Leasure 1993) and was selected as an indicator of project-related effects to grassland bird SOCC (e.g., bobolink). Also a grassland species, American badger was selected as a KI because of its preference for habitats that support coherent soils conducive to burrowing (COSEWIC 2012). Suitable soil conditions and adequate prey base are key factors influencing the abundance and distribution of American badger. Northern leopard frog was selected as a KI for wetland-dependant SOCC and not-at-risk amphibians. Northern leopard frog breeds in grassy ponds, forage in moist habitats including grasslands and shrublands, and overwinter in permanent, well-oxygenated waterbodies (Environment Canada 2013).

9.8.2.3 Selection of Environmental Effects and Measurable Parameters

The environmental assessment of SOCC is focused on the following environmental effects:

- Change in SOCC habitat availability
- Change in SOCC mortality risk
- Change in SOCC distribution

Table 9.8-3 presents the measureable parameters used for assessing Project-related effects on SOCC. These measurable parameters were based on the professional judgment of the Study Team.

Table 9.8-3: Measurable Parameters for Species of Conservation Concern

Environmental Effect	Measurable Parameter	Rationale for Selection of Measurable Parameter
Change in SOCC Habitat Availability	Changes in breeding, overwintering, or unique habitats	Addresses the loss of natural habitat which is already limited within the Project assessment areas due to pre-existing development
		The RAA already constitutes a highly homogenous landscape
Change in SOCC Mortality Risk	Transmission line or tower/bird collisions	Addresses the loss of bird SOCC due to the presence of Project infrastructure
	Traffic collisions	Addresses the loss of wildlife due to increased traffic during phases of Project development (vehicle/ wildlife collisions)
Change in SOCC Distribution	Changes in noise/light levels Sensory disturbances	Addresses the alteration or desirability of existing habitat due to presence of equipment and personnel, especially at night and during critical timing windows (i.e., potential disruption of daily/migratory movement patterns due to presence of equipment/humans)

9.8.3 Residual Environmental Effects Description Criteria

Descriptors listed in Table 9.8-4 are used to characterize and evaluate residual environmental effects of the Project on SOCC.

Table 9.8-4: Characterization of Residual Environmental Effects for Species of Conservation Concern

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	Changes in SOCC habitat availability	**Positive** – an increase in SOCC habitat, distribution or a reduction in SOCC mortality risk within the RAA or LAA
		Adverse – a decrease in SOCC habitat, distribution or an increase in SOCC mortality risk within the RAA or LAA

Table 9.8-4: Characterization of Residual Environmental Effects for Species of Conservation Concern

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		Neutral – no net change in SOCC habitat, distribution or mortality risk within the RAA or LAA
Magnitude	The amount of change in a measurable parameter or variable relative to the baseline case	**Negligible** – no measurable change in existing SOCC habitat, distribution or mortality risk in the RAA or LAA
		Low – a very small measurable change in existing SOCC habitat, distribution or mortality risk in the RAA or LAA
		Moderate – a measurable change in SOCC habitat, distribution or mortality risk in the RAA or LAA
		High – a measurable and substantive change to SOCC habitat, distribution or mortality risk in the RAA or LAA
Geographical Extent	The geographic area within which the environmental effect of a defined magnitude occurs	**PDA/LAA** – loss/change in SOCC habitat, distribution or mortality risk is restricted to the PDA/LAA
		RAA – loss/change in SOCC habitat, distribution or mortality risk extends into the RAA
Timing and Frequency	Effect to SOCC habitat may occur from construction activities and/or project operation	**Once** –effect considered to be a one-time event (e.g., land clearing).
		Infrequent –effects considered to likely occur a few times per year
		Frequent – effects is likely to occur more than a few times per year
		Continuous – effects considered to occur for the life of the project (construction through decommissioning).
Duration	Length of time for SOCC habitat to revert to pre-project conditions	**Short-term** – effects to SOCC habitat, distribution or mortality risk will be restricted to construction phase

Table 9.8-4: Characterization of Residual Environmental Effects for Species of Conservation Concern

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		Medium-term – effects to SOCC habitat, distribution or mortality risk will continue through construction and overlap with part of the operational phase
		Long-term – effects to SOCC habitat, distribution or mortality risk will continue through operation
		Permanent – effects SOCC habitat, distribution or mortality risk is permanent
Reversibility	Likelihood that SOCC habitat will recover from project construction and operation	**Reversible** – SOCC habitat, distribution or mortality risk could recover if project was decommissioned
		Irreversible – effects to SOCC habitat, distribution or mortality risk are permanent
Ecological and Socio-economic Context	The Project is located predominantly on agricultural land, with some pasture	**Low-disturbance** – land supports large, intact areas of natural vegetation/SOCC habitat
		Moderate-disturbance – land has been modified for agriculture and/or human development yet supports some large areas of natural vegetation/SOCC habitat
		High-disturbance – land has been highly modified for agriculture and/or other human development; much of the original natural vegetation/SOCC habitat has been converted to other land uses
Likelihood of Significant Effect		**Low** – a low likelihood of the significant effect occurring
		Medium – a medium likelihood of the significant effect occurring
		High – a high likelihood of the significant effect occurring

9.8.3.1 Significance Thresholds for Residual Environmental Effects

Residual effects rating criteria for potential environmental effect of the Project on SOCC are considered significant if they result in any of the following:

- For Endangered or Threatened SAR (under SARA or MESA) – an effect that contravenes the prohibitions listed by SARA or MESA.
- For other SOCC – an effect that changes the terrestrial habitat or results in direct mortality of individuals or communities in such a way as to substantially reduce the likelihood of long-term survival of populations within the RAA.

9.8.4 Existing Conditions for SOCC

9.8.4.1 Baseline Data Sources

Documentation of existing environment conditions for wildlife SOCC in the Project RAA relied on the following data sources:

- Canadian Land Cover classification (LCC)
- Aerial photos of the RAA
- Historical breeding bird survey data from the North American Breeding Bird Survey Program and the Manitoba Breeding Bird Atlas.
- SOCC records from SARA, MESA and Manitoba Conservation.
- Bird survey data collected in the Project RAA/LAA during the 2013 field program (Stantec 2013).
- Reconnaissance wildlife and wildlife habitat data gathered during a driving survey in October 2013. Wildlife and wildlife habitat was also gathered during riparian area inspections conducted in representative areas of the RAA in August 2013 (Appendix C).
- Wildlife data collected previously for other projects located within the vicinity of the Project area.

9.8.4.2 Baseline Overview

Eighteen bird SOCC, along with northern leopard frog and American badger, have the potential to occur within the RAA. Eastern wood-pewee, barn swallow and yellow rail have been detected along a provincial Breeding Bird Survey Route located within the RAA (Appendix C). Red-headed woodpeckers are known to nest within the Red River riparian zone, and bobolink have been frequently observed in hay fields (Appendix C). Although unlikely to breed within the RAA, ferruginous hawks have been observed along the Red River corridor during spring migration.

Short-eared Owl

The short-eared owl is a ground-nesting species characteristic of open habitats such as marshes, grasslands, pastures and occasionally fields planted with row-crops (COSEWIC 2008b). Once known to be a species typical of prairie habitats, the short-eared owl is now uncommon in these areas. Potential factors contributing to this species' decline include habitat loss (especially of coastal marshes and grasslands), habitat fragmentation (resulting in increased nest depredation), reduction in prey abundance, and collisions with vehicles, utility lines and barbed wire fences (COSEWIC 2008b). Although recorded short-eared owl observations within the RAA are rare, they have been recorded by the North American breeding bird survey data (USGS 2013) and Manitoba Breeding Bird Atlas data (MB Breeding Bird Atlas 2013). Short-eared owl habitat within the RAA/LAA may potentially occur within areas designated as grassland and pasture land cover. These habitat types occur within 17% of the RAA and 16% of the LAA.

Northern leopard frog

Information obtained from the Manitoba Conservation Data Centre reveals that northern leopard frogs are present throughout the RAA (MBCDC 2013). In addition to this baseline data, two leopard frogs were observed along the Marsh River on August 7, 2013 during riparian area inspections conducted for the Project (Appendix C).

Northern leopard frogs occupy a variety of habitat types during their life cycle (COSEWIC 2009). Breeding and larval stages occur within a variety of wetland types including ponds, quiet backwaters of streams, roadside ditches, borrow pits, channels and wet meadows (Wershler, 1991). Breeding sites typically support emergent vegetation along gradual sloping pond edges. Potential overwintering sites include ponds that are deeper than 2 m (do not freeze to the bottom) and do not support a fish community (Merrell 1968; COSEWIC 2009). Although considered marginal, the Red River may be used as an overwintering site for northern leopard frog. Based on land cover, 13% of the LAA and 14% of the RAA consists of potential northern leopard frog habitat.

Northern leopard frog populations are threatened by emerging diseases, as well as the introduction of non-native predatory species. Their requirement of different habitats for breeding, foraging and overwintering makes this species particularly sensitive to habitat disturbances (COSEWIC 2009).

American Badger

There are no documented occurrences of American badger within the RAA. However, based on land cover, 18% of the LAA and 21% of the RAA consists of potential American badger habitat. Badgers prefer grassland and/or shrubland habitats that contain soils capable of supporting badger burrows (COSEWIC 2012). Agricultural practices limit the suitability of soils for burrowing animals through tilling (reducing soil cohesiveness) and/or through soil compaction (soils too dense for burrowing). Within the RAA, existing American badger habitat (e.g., grassland) is fragmented by roads, development and agriculture. As a result, American badgers are largely limited to roadside ditches, pastureland, or undisturbed grassland or forest edges. Their use of roadsides puts them at an increased risk to vehicle collisions. Vehicle-related mortality, along with persecution from landowners and eradication of ground squirrels, a prey food, are other factors contributing to current population declines (COSEWIC 2012).

9.8.5 Project Environmental Effects on SOCC

9.8.5.1 Analytical Methods

Effects on SOCC habitat were assessed by mapping preferred habitat types in the RAA and calculating areas lost or altered as a result of the Project. Habitat models for short-eared owl and American badger were developed using the land cover classification, which provides course information on plant community. Using course habitat information to determine the amount and distribution of wildlife habitat has its limitations. For example, American badger requires open habitats that provide soils capable of supporting burrows. Not all of the grassland or shrubland mapped within the RAA is likely suitable for American badger. Soil compaction and eradication of prey foods (e.g., ground squirrels) are important factors influencing the capability of open habitats to support badgers.

For northern leopard frog, aquatic habitats were mapped along with all moist grassland and shrubland located within 8 km (dispersal distance of northern leopard frog; Environment Canada 2013).

The federal land cover classification data (Government of Canada 2009) was used to determine potential availability of short-eared owl, American badger and northern leopard frog habitat within the RAA, and the potential loss and/or alteration of habitat associated with Project construction.

9.8.5.2 Assessment of Change in SOCC Habitat Availability

Table 9.8-5 summarizes the effects of the Project on SOCC habitat availability for each of the key indicator species. The effects ranked as 2 are discussed in more detail for the construction and operation phases below.

Table 9.8-5: Changes to SOCC Habitat Availability as a Result of the Project

Key Indicator	Project Phase	
	Construction	Operation
Northern leopard frog	Direct habitat loss/ habitat alteration	Negligible change
Short-eared owl	Direct habitat loss/habitat alteration	Habitat alteration
American badger	Direct habitat loss/ habitat alteration	Habitat alteration

9.8.5.2.1 Construction-Related Effects

During Construction, clearing activities have been ranked as 2 for changes in short-eared owl and American badger habitat. As surfaces are prepared for drilling and tower installation, vegetation removal and soil disturbance may result in direct loss, alteration and/or fragmentation of SOCC habitat. Approximately 76 ha of short-eared owl habitat (0.4% of total available suitable short-eared owl habitat located in the RAA) will be affected by construction activities. Some of this will be lost temporarily during the construction period, returning during the Project operation phase as vegetation and small mammal communities re-establish on non-cultivated portions of the ROW. For these reasons, the Project is not anticipated to contribute to the fragmentation of short-eared owl habitat (patches of grassland, shrubland >28 ha). For American badger, use of heavy construction equipment within the PDA could alter potential burrow habitat (e.g., grasslands, shrublands, forest edges, roadsides) for both badger and their prey species (e.g., ground squirrels) by compacting soils. Approximately 93 ha American Badger habitat will be lost or altered (0.3% of the total available badger habitat in RAA).

Modifications to the existing St. Vital, La Verendrye and Letellier stations will occur within the fenced station sites. As such, no change in SOCC habitat availability as a result of these activities is expected to occur.

9.8.5.2.2 Operation-Related Effects

Project presence was ranked as 2 for changes in short-eared owl and American badger habitat due to the reduction of habitat availability resulting from presence of transmission line components and the ROW, as well as ongoing maintenance activities.

The St. Vital, Letellier and La Verendrye stations will continue to operate as they currently do during the operations and maintenance phases of the Project, therefore operations-related Project effects on SOCC as a result of these activities are not expected to occur.

9.8.5.2.3 Mitigation for Project Effects on SOCC Habitat Availability

Efforts to minimize adverse effects on SOCC occurred during the route selection process, which considered and avoided (to the extent feasible) sensitive areas (e.g., Rat River Swamp) and SOCC habitats (e.g., grassland, wetland).

Additional mitigation measures proposed to minimize the effects of construction-related activities on habitat availability for SOCC are as follows:

- Project construction and vegetation management activities will be restricted during the bird breeding and brood rearing period (See Table 10.3-1 for timing windows), unless noted otherwise by federal or provincial guidelines for SOCC (Table 9.8-1).
- If construction activity overlaps with the federal or provincial activity restriction dates outlined for avian SOCC, pre-construction nest searches will be carried out in areas that have the potential to support avian SOCC. If active nests are identified, federal or provincial buffers will be applied (Table 9.8-2).
- If construction activity overlaps with the amphibian breeding period, pre-construction amphibian surveys will be carried out in areas that have the potential to support amphibians. In areas where breeding is confirmed, federal or provincial buffers will be applied to minimize project-related disturbance.
- A 30-m vegetated buffer will be retained around wetlands, streams and other river crossings.
- In areas of the ROW where trees are cleared, low woody vegetation will be retained to minimize habitat loss for SOCC.
- Travel of construction equipment through grassland and shrubland will be minimized to the extent possible in order to reduce soil compaction, which can adversely affect American badger breeding and foraging habitat.
- Existing trails and roads will be used wherever possible.
- Access roads/trails, marshalling yards and other non-permanent project footprints will be rehabilitated when no longer required.
- Comply with any additional beneficial management practices specific to SOCC and SOCC habitat outlined in the Project Construction EnvPP (e.g., implementation of species specific setback distances from nest locations, etc., see Table 9.8-2).

9.8.5.3 Assessment of Change in SOCC Mortality Risk

Table 9.8-6 summarizes the effects of the Project on mortality risk for each of the key indicator species. These effects are discussed in more detail for the construction and operation phases below.

Table 9.8-6: Changes to SOCC Mortality Risk as a Result of the Project

Key Indicator	Project Phase	
	Construction	Operation and Maintenance
Northern leopard frog	Increased collision risk with increased traffic volume	Increased mortality risk during vegetation management
Short-eared owl		Increased mortality risk from transmission line collision during breeding and migration seasons
American badger		Negligible

9.8.5.3.1 Construction-Related Effects

Project clearing was ranked as 2 for changes to mortality risk due to the potential for vehicle collisions involving SOCC. Collisions with road vehicles are among the top five causes of human-related bird mortality in Canada (Calvert et al. 2013) and have been identified by COSEWIC as factor contributing to the decline in some species at risk populations including short-eared owl (COSEWIC 2007). The presence of crews carrying out clearing activities will result in an increase in traffic as workers will be travelling to, from and within the PDA. This may lead to a short-term increase in vehicle collision risk for short-eared owl, northern leopard frog and American badger in areas where suitable breeding and/or foraging habitat occurs. Of all construction-related activities, it is anticipated that traffic volumes will be highest during clearing activities.

9.8.5.3.2 Operation-Related Effects

Project presence was ranked as 2 for SOCC due to the increased risk of bird mortality resulting from collisions with transmission wires and electrocutions.

Collisions with transmission lines are among the top five causes of human-related bird mortality in Canada (Calvert et al. 2013). Risk of bird-transmission line collisions is influenced by several factors relating to physical characteristics of the bird (species, age, size, health), general flight activity of the bird (flocking, aerial courtship displays, nocturnal flight vs. day flight), characteristics of the transmission line and a variety of environmental factors (weather, habitat, location; APLIC 2012). American and European studies report raptors as being one of the bird groups most susceptible to transmission line collisions (Bevanger 1998, Janss 2000; Erickson et al. 2001; Rubolini 2005; APLIC 2012; Rioux et al 2013). Perching birds with small bodies and large wingspans, including species like short-eared owl, are at the greatest risk of electrocution (Bevanger 1998). Additional information regarding avian collisions with transmission lines is discussed in Section 9.6.5.

The St. Vital to Letellier (V95L) transmission line traverses predominantly agricultural lands in a north-south direction. With the exception of the Red River crossing, the line does not bisect or parallel waterbodies or other areas that may concentrate birds and elevate collision risk. The highly disturbed state of the Southern Loop corridor is not anticipated to elevate collision risk.

Vegetation management may result in the disturbance or destruction of short-eared owl nests in areas where the transmission line ROWs overlap with large tracts of grassland habitat. These activities also have the potential to disrupt/destroy American badger burrows in uncultivated areas and increase the mortality risk for northern leopard frogs foraging in riparian areas and/or moist grasslands. As such, vegetation management was assigned a 2 for its potential effect on SOCC mortality risk.

9.8.5.3.3 Mitigation for Project Effects on SOCC Mortality Risk

The following section describes mitigation measures to minimize effects of Project construction and operation activities on SOCC mortality.

General mitigation measures used to mitigate effects during Project construction and operation include:

- Travel speeds will be reduced along the ROW to minimize risk of SOCC mortality.
- Line-markers or bird diverters will be installed on transmission wires crossing over major river crossings (i.e., Red River).
- Project clearing and vegetation management mowing activities will avoid the sensitive bird breeding and brood rearing period (mid-April to the end of August, unless noted otherwise by federal or provincial guidelines for bird SOCC).
- If land clearing is required during the sensitive breeding period, pre-construction nest searches will occur in areas having potential to support SOCC; if nests are found, appropriate buffers recommended by federal or provincial setback guidelines will be applied (Table 9.8-1).
- If construction activities are required between April 1st and May 31st (northern leopard frog breeding season), pre-construction amphibian surveys will occur in areas of the PDA having potential to support amphibian SOCC; if breeding is confirmed, appropriate buffers recommended by federal or provincial setback guidelines will be applied.

9.8.5.4 Assessment of Change in SOCC Species Distribution

Table 9.8-7 summarizes the effects of species distribution on northern leopard frog, short-eared owl and American badger. These effects are discussed in more detail for the construction and operation phases below.

Table 9.8-7: Changes in Habitat Use Resulting from Species Distribution

Key Indicator	Project Phase	
	Construction	Operation
Northern leopard frog	Habitat abandonment or avoidance and disruption of daily movements; disruption of breeding activity and breeding success	Habitat abandonment or avoidance during vegetation management
Short-eared owl	Habitat abandonment or avoidance and disruption of daily movements	Habitat abandonment or avoidance during vegetation management
American badger		

9.8.5.4.1 Construction-Related Effects

Clearing activities during construction of the Project was ranked as 2 for change in SOCC species distribution. These activities will generate noise from mowing, cutting and/or removal of vegetation along the ROWs. In response, short-eared owl, American badger and northern leopard frog are anticipated to avoid areas adjacent to the PDA for the short-term. While this may result in the indirect loss of habitat for SOCC inhabiting the area, the effect is anticipated to be short in duration as animals are expected to return once construction has been completed.

The physical presence of humans and machinery could affect seasonal and daily movements of some species or individuals as they alter their pathways to avoid disturbance. This effect is anticipated to be short-term and limited to the construction phase.

9.8.5.4.2 Operation-Related Effects

Project presence and vegetation management was ranked as 2 for change in SOCC species distribution. The physical presence of towers could affect daily movements within the PDA and/or LAA of some avian SOCC as they alter their pathways to avoid the infrastructure.

During some vegetation management activities noise will be generated from machines and equipment used to cut and maintain vegetation on the ROW. These activities may result in a temporary displacement of SOCC from the immediate area.

9.8.5.4.3 Mitigation for Change in SOCC Species Distribution

Measures to mitigate change in SOCC species distribution are similar to those described in Section 9.7with the addition of the following measure:

- Should construction activity occur between April 1st and May 31st (northern leopard frog breeding season) activities will be restricted between one half hour after sunset to 0100h in areas of the LAA where northern leopard frogs are confirmed breeding.

9.8.5.5 Summary of Project Residual Environmental Effects on SOCC

Table 9.8-8 below, summarizes the overall significance determinations of residual Project effects on SOCC. Overall, the individual Project effects on habitat availability, risk of mortality and species distribution will be local and will affect only a small proportion of the regional SOCC populations. Based on the assessment conducted, the Project will not have a discernable effect on the populations' viability of any SOCC species above baseline conditions.

9.8.5.6 Determination of Significance of Residual Environmental

9.8.5.6.1 Change in Species of Conservation Concern Habitat Availability

The Project will be located predominantly on agricultural lands, with minimal loss to SOCC habitats (e.g., grassland, shrublands). Within the RAA, approximately 0.3% (90 ha) of the short-eared owl habitat, 0.3% (93 ha) of American badger habitat and 0.4% (72 ha) of northern leopard habitat will be lost or altered by the Project. In order to minimize adverse effects on SOCC, land clearing will occur outside of the sensitive breeding period. Pre-construction surveys for SOCC (e.g., northern leopard frog, short-eared owl) will be conducted at in areas of the LAA that support suitable breeding habitats. Appropriate setbacks, as described by federal and/or provincial guidelines, will be applied to active breeding sites.

The effect of clearing activities and operation on habitat availability is characterized as being adverse, moderate in magnitude and restricted to the LAA. The effect will be continuous through the Project life and reversible. Given the limited extent of changes to habitat availability, the effect is not expected to causes changes in abundance and distribution of a species such that its population would no longer be secure in the RAA. The effect of the Project on SOCC habitat availability is assessed as being not significant.

9.8.5.6.2 Change in SOCC Mortality Risk

The Project is anticipated to increase SOCC mortality risk in areas of the PDA that cross through SOCC habitats. For short-eared owl, American badger and northern leopard frog, this risk is elevated by the presence of construction vehicles during the construction phase and vegetation management mowing equipment during the operation phase. In order to minimize this effect, construction equipment will operate at reduced travel speeds in areas that have the potential to support SOCC. During operations, the presence of towers and overhead wires will increase the mortality risk to birds (through electrocutions or line strikes) breeding within or migrating through the area. For avian SOCC, potential for line strikes is low due to the lack of suitable breeding habitat within the LAA.

The effect of Project operation activities on SOCC mortality risk is characterized as being adverse, moderate in magnitude and restricted to the LAA. The effect will be continuous through the operation phase and therefore irreversible. Mitigation methods to minimize the change in mortality risk to SOCC will limit the effects on mortality. Changes in abundance and distribution of a species such that its population would no longer be secure in the RAA are not expected. The effect of the Project on SOCC mortality is assessed as being not significant.

9.8.5.6.3 Change in SOCC Distribution

During construction, noise, lighting and human activity could cause SOCC to avoid preferred habitats that are located adjacent to construction areas. These sensory disturbances have the potential to result in a small indirect loss of SOCC habitat resulting in changes in species distribution lasting until disturbance ceases. These effects will be mitigated through application of buffers/set-backs around active nests, burrows and breeding ponds located in areas adjacent to the PDA.

During Project operation, presence of the Project, as well as vegetation management activities may result in change in SOCC distribution. The physical presence of towers could affect daily movements of some SOCC species or individuals as they alter their pathways to avoid disturbance. The effect of sensory disturbance to SOCC from operation activities is characterized as being adverse, low in magnitude and restricted to the LAA. The effect will occur throughout the operation phase and is considered reversible.Changes in SOCC distribution will be restricted to the LAA and is not expected to change the distribution of a species such that its population would no longer be secure in the RAA. The effect of the Project on SOCC distribution is assessed as being not significant.

Table 9.8-8: Summary of Residual Project Effects on SOCC

Potential Residual Environmental Effects for the Project	Proposed Mitigation	Residual Environmental Effects Characteristics								Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Environmental Context	Significance	Likelihood of Significant Effects	
Changes in SOCC Habitat Availability										
Construction - Clearing	• 30-m vegetated buffers will be maintained around wetlands, streams and other river crossings. • Land clearing activities will be restricted during the bird breeding and brood rearing period (See Table 10.3-1 for timing windows) • Land clearing activities within preferred habitat areas will be restricted during peak northern leopard frog breeding period (April 1 – May 31)	A	M	L	MT/C	R	HD	N	N/A	Searches for nests and sensitive breeding areas will be conducted prior to commencement of construction activities in habitats capable of supporting SOCC species General monitoring that the EnvPP is being implemented appropriately

Table 9.8-8: Summary of Residual Project Effects on SOCC

Potential Residual Environmental Effects for the Project	Proposed Mitigation	Residual Environmental Effects Characteristics								Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Environmental Context	Significance	Likelihood of Significant Effects	
	• Pre-construction nest searches will be carried out if clearing activity overlaps with Wildlife reduced risk timing windows. • Pre-construction amphibian surveys will be carried out if clearing activity overlaps with wildlife reduced risk timing windows. • Compliance with setbacks and buffers outlined in EnvPP • Low woody vegetation will be maintained along the ROW, where possible, to enhance bird habitat • Existing roads and trails should be utilized wherever possible									

Table 9.8-8: Summary of Residual Project Effects on SOCC

Potential Residual Environmental Effects for the Project	Proposed Mitigation	Residual Environmental Effects Characteristics								Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Environmental Context	Significance	Likelihood of Significant Effects	
	• Repeated travel along the right-of-way or other access route should be minimized to prevent soil compaction, which can affect foraging and burrow development by American badger									
Operation and Maintenance - Project Presence, Vegetation Management	• Vegetation management mowing activities will be restricted in habitat areas, during peak northern leopard frog breeding period (April 1 – May 31) • Vegetation management mowing activities will be restricted during the bird breeding and brood rearing period (See Table 10.3-1 for timing windows)	A	M	L	MT/C	R	HD	N	N/A	

Table 9.8-8: Summary of Residual Project Effects on SOCC

Potential Residual Environmental Effects for the Project	Proposed Mitigation	Residual Environmental Effects Characteristics								Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Environmental Context	Significance	Likelihood of Significant Effects	
Changes in SOCC Mortality Risk										
Construction - Clearing	• Travel speeds along the ROW will be reduced • Existing roads and trails should be utilized wherever possible • Project construction activities will be restricted during the bird breeding and brood rearing period (See Table 10.3-1 for timing windows) • Project construction and vegetation management activities will be restricted during peak northern leopard frog breeding period (April 1 – May 31) • 30-m vegetated buffers will be maintained around wetlands, streams and other river crossings.	A	M	L	MT/C	R	H	N	N/A	Implement a bird mortality program to be carried out during Project construction General monitoring that EnvPP is being implemented appropriately

Table 9.8-8: Summary of Residual Project Effects on SOCC

Potential Residual Environmental Effects for the Project	Proposed Mitigation	Residual Environmental Effects Characteristics								Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Environmental Context	Significance	Likelihood of Significant Effects	
	- Pre-construction nest searches will be carried out if clearing activity overlaps with wildlife reduced risk timing windows - Pre-construction amphibian surveys will be carried out in areas having potential to support amphibian SOCC									
Operation and Maintenance - Project Presence, Vegetation Management	- Line-markers or bird diverters will be placed on transmission wires over the Red River and potentially at other river crossings where bird collision risk was deemed to be likely - Vegetation management activities will be restricted during the bird breeding and brood rearing period (See Table 10.3-1 for timing windows)	A	M	L	LT/C	I	HD	N	N/A	Implement a bird mortality program to be carried out during Project construction

Table 9.8-8: Summary of Residual Project Effects on SOCC

Potential Residual Environmental Effects for the Project	Proposed Mitigation	Residual Environmental Effects Characteristics								Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Environmental Context	Significance	Likelihood of Significant Effects	
	• Vegetation management activities will be restricted during peak northern leopard frog breeding period (April 1 – May 31)									
Change in SOCC Sensory Disturbance										
Construction - Clearing	• See mitigation outlined above for Change in SOCC Habitat Availability	A	M	L	ST/F	R	HD	N	N/A	General monitoring that the EnvPP is being implemented appropriately
Operation and Maintenance - Project Presence, Vegetation Management	• See mitigation outlined above for Change in SOCC Habitat Availability	A	L	L	LT/F	I	HD	N	N/A	

KEY (Refer to Table 9.8-4 for definitions on the terms referenced below):

Direction: P: Positive; A: Adverse; N: Neutral

Magnitude: N: Negligible; L: Low; M: Moderate; H: High

Geographic Extent: L: Local- within the PDA/LAA; R: Regional - within the RAA

Duration: ST: Short-term; MT: Medium-term; LT: Long-term; P: Permanent – will not change back to original condition

Frequency: S: Single Event; I: Infrequent; F: Frequent; C: Continuous.

Reversibility: R: Reversible; I: Irreversible.

Table 9.8-8: Summary of Residual Project Effects on SOCC

Potential Residual Environmental Effects for the Project	Proposed Mitigation	Residual Environmental Effects Characteristics								Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Environmental Context	Significance	Likelihood of Significant Effects	

Ecological/Socio-economic Context: LD: Low disturbance; MD: Moderate disturbance; HD: High-disturbance

Significance: S: Significant; N: Not Significant.

Likelihood of Significant Effect: Based on literature review and professional judgment. N/A: Not Applicable L: Low, M: Medium; H: High.

9.8.6 Cumulative Environmental Effects on SOCC

This section consists of an evaluation of the effects of the Project on SOCC in combination with the effects of other projects or activities that will likely overlap spatially and temporally with those of the Project. The focus of this cumulative effects assessment is on those residual project effects identified in the section above. These effects are considered in relation to the past, current and reasonably foreseeable future projects and activities listed in the table below, to evaluate the potential for the effects from the Project to act cumulatively in a manner that could cause a change in the VC that will alter its status or integrity beyond an acceptable level, relative to the established threshold.

The potential for interaction between the effects of the Project on SOCC and the effects of other identified past, current and future projects and activities are presented in Table 9.8-9. Projects will have an interaction ranked as 0 if Project environmental effects do not overlap spatially and temporally with those of other projects and activities, and, therefore, do not have the potential to act cumulatively with those of other projects and activities. Interactions ranked as 1 are Project environmental effects that act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). Interactions ranked as 2 are those interactions where Project environmental effects act cumulatively with those of other projects and activities, and may exceed acceptable levels without the implementation of project-specific or regional mitigation.

Table 9.8-9: Potential Cumulative Environmental Effects on SOCC

Other Projects and Activities with Potential for Cumulative Environmental Effects		Potential Cumulative Environmental Effect		
		Change in SOCC Habitat Availability	**Change in SOCC Mortality Risk**	**Change in SOCC Distribution**
Infrastructure Projects	PTH 59 Twinning	1	1	1
	PTH 52 Twinning	1	1	1
	PTH 75 Rehabilitation	0	0	0
Residential Projects	Sage Creek Residential Development	0	0	0
Energy Projects	Manitoba-Minnesota Transmission Project	1	1	1
	Bipole III Transmission Project	1	1	1
	St. Joseph Windfarm Project	1	1	1

Table 9.8-9: Potential Cumulative Environmental Effects on SOCC

Other Projects and Activities with Potential for Cumulative Environmental Effects	Potential Cumulative Environmental Effect		
	Change in SOCC Habitat Availability	Change in SOCC Mortality Risk	Change in SOCC Distribution

KEY:

Cumulative environmental effects were ranked as follows:

0 = Project environmental effects do not act cumulatively with those of other projects and activities.

1 = Project environmental effects act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of beneficial management or codified practices.

2 = Project environmental effects act cumulatively with those of other projects and activities and the resulting cumulative effects may exceed acceptable levels without implementation of project-specific or regional mitigation.

9.8.6.1 Assessment of Cumulative Effects on Infrastructure and Services

9.8.6.1.1 Infrastructure Projects

Future infrastructure projects that will overlap spatially with the Project include the twinning of PTH 59 and PTH 52. PTH 59 runs south of Winnipeg and intersects with the Southern Loop corridor and proposed St. Vital to Letellier (V95L) transmission line route 3 times. Of the total length of PTH 59 that requires twinning, approximately 41 km cross the RAA and 12 km through the LAA. PTH 52 runs east from PTH 59 and intersects with the proposed St. Vital to Letellier (V95L) route once. Of the total length of PTH 52 that requires twinning, approximately 7 km cross the RAA, 2 km of which transect the LAA perpendicularly. Loss of SOCC habitat, increase in SOCC mortality risk and increase in sensory disturbance to SOCC are all potential effects of this proposed project.

Similar to the Project lines, both PTH 59 and PTH 52 cross highly disturbed landscapes where agricultural cropland is the predominant land cover type.

Mortality and sensory disturbance from PTH 59 and PTH 52 are an existing effect for wildlife communities utilizing habitats bordering these major highways. Increase in mortality risk from vehicle collisions and increased sensory disturbance may result from construction of the twinning project\

9.8.6.1.2 Energy Projects

Construction and operation of the Manitoba to Minnesota Transmission Project (MMTP) and Bipole III (BPIII) Transmission Project may overlap temporally and spatially with the Project. The BPIII project crosses the Project ROW once, south of Niverville, and traverses the width of the RAA (10 km). This portion of the BPIII transmission route includes a crossing of Red River and mostly agricultural cropland. Loss of SOCC habitat, increase in SOCC mortality risk and change in SOCC distribution are all potential effects of the Project. Route selection for MMTP is still under review; one proposed option may run parallel to the RAA eastern edge while other route options are located several kilometres east of the RAA.

Both the BPIII transmission route and the proposed MMTP route option nearest to the RAA transect primarily agricultural habitat. Agricultural cropland provides marginal SOCC habitat.

Increased mortality risk and sensory disturbance to SOCC are potential effects of the BPIII and MMTP projects. Assuming effective project-specific mitigation is implemented for these projects, effects are expected to be localized.

Transmission

Construction and operation of the Manitoba to Minnesota Transmission Project (MMTP) and Bipole III (BPIII) Transmission Project overlap temporally and spatially with the RAA. The BPIII project crosses the Project ROW once, south of Niverville, and traverses the width of the RAA (10 km). This portion of the BPIII transmission route includes a crossing of Red River and mostly agricultural cropland. Loss of SOCC habitat, increase in SOCC mortality risk and increase in sensory disturbance to SOCC are all potential effects of the Project. Route selection for MMTP has identified a preliminary preferred route options which have been the subject of its own PEP; the identified route options would use the same Southern Loop corridor as the Project and would cross over the St. Vital to Letellier (V95L) route in the RM of Ritchot within the Project RAA.Both the future BPIII transmission route and the proposed MMTP route options transect primarily agricultural habitat.

Increased mortality risk and sensory disturbance to SOCC are potential effects of the BPIII and MMTP projects. Assuming effective project-specific mitigation is implemented, effects are expected to be localized to local SOCC populations.

Wind Energy

The St. Joseph Windfarm is located near St. Joseph, MB west of PTH 75, south of PTH 14 and north of PR 421. This windfarm consists of 60 2.3-MW turbines (Canwea 2008) and will overlap spatially and temporally with the Project RAA. The St. Joseph Windfarm is situated in an agricultural dominated landscape where most turbines have been placed on annual cropland. For this reason, effects on American badger and northern leopard frog are considered negligible. Bird habitat loss was not considered to be a significant effect of this project's construction (Helimax 2008).

Recent literature studies have shown that in Canada, windfarms result in lower bird mortality rates than transmission lines (Calvert et al. 2013; Zimmerling 2013). National estimates suggest that on average, approximately 8.2 birds per turbine are killed as a result of turbine collision each year. On a national level for most species, this has been estimated to have an annual effect of less than 0.8% of any population.

9.8.6.2 Summary of Project Cumulative Environmental Effects on SOCC

The total cumulative effect to SOCC consists of changes in SOCC habitat availability and SOCC distribution under project footprints and along ROW maintenance trails and roads in association with the energy (transmission projects and wind energy projects) and highway twinning projects. Cumulative effects to SOCC mortality risks stem from the direct mortality from wind turbine generators (WTGs) and vehicle and transmission line collisions. The overall magnitude of the change in these effects is considered low to moderate as the measureable change in SOCC populations and habitats within the context of the regional assessment area is small and relatively minor, due to the predominantly highly disturbed state of the landscape from agricultural practices within the regional assessment area. The changes to SOCC are considered reversible throughout the life of the projects considered. Although SOCC habitat availability and distributions in these areas will be altered during construction and SOCC mortality risk will increase with increased traffic, appropriate mitigation to avoid adverse effects on SOCC will be implemented. Project-related disturbance to habitats will be minimized and areas returned to pre-construction condition (to the extent possible), with the focus to maintain the function of vegetation (e.g., providing SOCC habitats). The project contribution to total cumulative effects considering effects to SOCC habitat availability, distribution of SOCC, and SOCC mortality risk is relatively small and when compared to the permanent land lost and increased traffic through infrastructure projects (i.e., highway twinning) in relation to the agricultural land within the regional assessment area.

A summary of the characterization of the cumulative effects on SOCC, including the cumulative environmental effects with the Project and the Project contribution to cumulative effects, is presented in Table 9.8-10. The characterization of cumulative residual environmental effects are considered following the mitigation prescribed to minimize project effects, as well as any follow-up and monitoring recommended.

Table 9.8-10: Summary of Cumulative Residual Environmental Effects on SOCC

Cumulative Environmental Effect and Project Contribution		Cumulative Residual Environmental Effects Characteristics						Significance	Likelihood of Significant Effect
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Ecological/Socio-Economic Context		
Change in SOCC Habitat Availability	Cumulative Effect with Project	A	L/M	L	MT/C	I	H	N	N/A
	Project Contribution to Cumulative Effect	A	L/M	L	MT/C	I	H	N	N/A
Change in SOCC Mortality Risk	Cumulative Effect with Project	A	L	L	MT/C	I	H	N	N/A
	Project Contribution to Cumulative Effect	A	L	L	MT/C	I	H	N	N/A
Change in Sensory Disturbances to SOCC	Cumulative Effect with Project	A	L/M	L	ST/S	R	H	N	N/A
	Project Contribution to Cumulative Effect	A	L/M	L	ST/S	R	H	N	N/A

KEY:

Direction: P: positive; N: neutral; A: adverse

Magnitude: N: Negligible – no measureable change to property and residences; L: Low – minor measurable change to property and residences; M: Moderate – a measurable change but less than high; H: High – a substantial measurable change to property and residences.

Geographic Extent: L: Local- within the PDA/LAA; R: Regional - within the RAA.

Duration: ST: Short term; MT: Medium Term; LT: Long Term; P: Permanent – will not change back to original condition.

Frequency: S: Single Event C: Continuous.

Reversibility: R: Reversible; I: Irreversible.

Ecological/Socio-Economic Context: U: Undisturbed H: Highly disturbed

Significance: S: Significant; N: Not Significant.

Likelihood of Significant Effect: Based on professional judgment – L: Low, low probability of occurrence; M: Medium, medium probability of occurrence; H: High, high probability of occurrence; N/A, Not Applicable.

9.8.7 Follow-up and Monitoring

Within the LAA, habitats capable of supporting SOCC will be monitored during each year of construction. Surveys for SOCC will occur in areas located within and adjacent to construction zones, and will be limited to the sensitive breeding period. The focus will be to determine the location of active SOCC breeding areas (e.g., nests, burrows, wetlands) in order to apply appropriate buffers/set-backs prior to the arrival of construction crews. Nests/breeding areas identified will be monitored to evaluate effectiveness of applied buffers.

Avian SOCC mortality, as a result of transmission line collisions will be monitored in areas where the transmission line crosses preferred SOCC habitats.

9.8.8 Summary

Construction of the Project will result in minimal effects on SOCC during the construction period. During Project operations, little or no effect on SOCC is anticipated.

9.9 TRADITIONAL LAND USE AND RESOURCE USE

9.9.1 Scope of Assessment for Traditional Land Use and Resource Use

9.9.1.1 Boundaries

The temporal boundaries for the consideration of potential effects of the Project on the traditional land and resource use include the duration of Project construction, operation and maintenance periods; see Section 3.7 for the Project construction schedule. Operation and maintenance of the Project will begin following construction and will be carried out until Project decommissioning.

The potential for Project environmental effects will be temporary and intermittent, peaking during the construction phase, and will diminish to much lower levels during operation and maintenance phases of the Project.

The spatial boundaries for the traditional Land and Resource Use environmental effects assessment are as follows:

Project Development Area (PDA): The PDA for traditional land and resource use includes the area within which all physical construction activities associated with the Project will take place. The PDA includes 119 km of transmission line between St. Vital Station and Letellier Station, and 37 km of transmission line between St. Vital Station and La Verendrye Station, and upgrades at the station sites. For the purposes of this assessment, a 40-m ROW was used.

Local Assessment Area (LAA): The LAA for the assessment is a 3-km wide corridor (1.5-km buffer on either side of the final preferred route) encompassing the PDA. One and a half kilometres on either side of the line is sufficient to encompass the effect of traditional land and resource use disturbance from Project-related traffic, equipment, and construction noise under most conditions.

Regional Assessment Area (RAA): The RAA used for traditional land and resource use was the same as that used for the mammal and bird assessments, namely a 10-km-wide buffer (5 km on either side of the final preferred route) encompassing the PDA and LAA.

The administrative boundaries for traditional land use pertain to the *Crown Land Act* administered by Manitoba Conservation and Water Stewardship, Lands Branch.

The administrative boundaries for the assessment of general land use pertain to the *Provincial Planning Act*, and associated regulations, administered by Manitoba Municipal Government. Specific regulations concerning land use are also enforced through the Seine-Rat River Conservation District, an agency of Manitoba Conservation and Water Stewardship, Water Stewardship Division.

The technical boundaries for the assessment of traditional land and resource use were based on a review of available information for the study area, including public and stakeholder engagement, and mapping and property identification data.

9.9.1.2 Identified Issues and Concerns

The public engagement activities, including stakeholder workshops and Aboriginal engagement, revealed the importance of natural resource use by First Nations and Metis; this includes hunting of ungulates, and trapping of furbearers.

9.9.2 Project Interactions with Traditional Land Use and Resource Use

Interactions with potential to affect traditional land use and resource use consist of clearing, drilling and tower installation during Construction and project presence, maintenance of infrastructure, and vegetation management during Operations and Maintenance (Table 9.9-1).

Table 9.9-1: Potential Project Environmental Effects on Traditional Land Use and Resource Use

Project Activities and Physical Works	Potential Environmental Effect	
	Interruption of Traditional Land Use	Loss of or Alteration to Traditional Sites
Construction:		
Clearing	1	1
Drilling	1	1
Marshalling Yards	0	0
Tower Installation	1	1

Table 9.9-1: Potential Project Environmental Effects on Traditional Land Use and Resource Use

Project Activities and Physical Works	Potential Environmental Effect	
	Interruption of Traditional Land Use	Loss of or Alteration to Traditional Sites
Stringing Conductors	0	0
Presence of Materials and Equipment	0	0
Site Reclamation	0	0
Station Upgrades	0	0
Operation and Maintenance:		
Project Presence	1	1
Maintenance of Infrastructure	1	1
Vegetation Management	1	1

KEY:

Project-related Environmental Effects were ranked as follows:

0 = No interaction.

1 = Interaction may occur; however, based on past experience and professional judgment, the resulting environmental effect is well understood and can be managed to acceptable levels through General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). No determination of significance of residual effects or cumulative effects assessment is warranted.

2 = Interaction may occur, and the resulting environmental effect may exceed acceptable levels without implementation of project-specific mitigation. Further assessment is warranted.

9.9.2.1 Justification and Rationale for Interactions Ranked as 1

All interactions have been ranked either 0 or 1. The assessment focused on the amount of Crown Land within the PDA, LAA and RAA that would provide opportunity to access for traditional land and resource use. No data are available whereby private landowners have granted permission for hunting, trapping, berry harvesting or plant gathering. The area of Crown Land within the RAA is 546.83 ha or 1.7% of the RAA. The LAA contains 507.49 ha, or 3% of the LAA, while the PDA contained 52.83 ha, or 4.2% of the PDA. The majority of Crown Land within the PDA, LAA and RAA is located within the City of Winnipeg.

During the construction phase, clearing, drilling and tower installation have been ranked as 1 for potential interruption of traditional land use and loss of, or alteration to, traditional sites. For this activity, the PDA will be disturbed by vegetation removal and soil disturbance as surfaces are prepared for drilling. These activities, as well as tower installation, may result in the removal of collectible and/or berry-producing plants. Presence of equipment and materials has been ranked as 1, and will potentially interact with mammal populations and, as a result, could temporarily interrupt hunting activities.

Any changes in mammal habitat associated with the project presence are rated not significant.

Interaction between mammals and infrastructure maintenance, which could interrupt traditional land use hunting, is limited to noise disturbance from traffic and line maintenance equipment. Any additional traffic due to line maintenance will be temporary and limited in extent, and thus is rated not significant.

9.9.3 Residual Environmental Effects Description Criteria

Potential residual environmental effects of all Project-related activities on Traditional Land Use and Resource Use were ranked as 1 in Table 9.9-1; therefore, no residual environmental effects description criteria or significance thresholds are defined for this VC.

9.9.4 Existing Conditions for Traditional Land Use and Resource Use

9.9.4.1 Baseline Data Sources

Baseline data sources are limited and consist of knowledge gained from the collection of baseline data through desktop literature review, information brought forward at open houses by First Nation members or members of the Manitoba Métis Federation, presentations with stakeholders, and data collected during field surveys conducted in conjunction with other Project assessments conducted as part of the EA. The data sources are summarized in Table 9.9-2.

9.9.4.2 Baseline Overview

The RAA, LAA and PDA are contained within Treaty 1 which was negotiated and signed at Lower Fort Garry in August 1871. Both Roseau River Anishinabe and Peguis First Nation were signatories to the Treaty. The reserve along the Roseau River was established in the early 1870s. The St. Peter’s Reserve along the Red River north of present-day Selkirk, MB, was set up for members of the present-day Peguis First Nation in the early 1870s, but was relocated to the current reserve lands northwest of Winnipeg MB in the early 1900s.

Table 9.9-2: Summary of Traditional Land Use Sources

Data Source	Objective	Result
Open Houses	To gain general comments and concerns, and assist with route selection	Limited TLU data collected and not site specific within PDA, LAA or RAA
First Nation and Manitoba Métis Federation input	To obtain site specific TLU data	Community information sessions and meetings
Treaty Land Entitlements	To determine if any outstanding land entitlement claims	No current claims within PDA, LAA or RAA

Historically, the Métis pursued traditional land uses within the Project PDA, LAA and RAA. The Métis maintained small riverlot farms along the Red, Seine and Rat rivers and augmented farming with hunting and trapping. A number of Métis entrepreneurs were involved in cart freighting on the Crow Wing Trail during the middle to late 1800s (Ledohowski 2003). Based on an agreement made between the Manitoba Métis Federation and the Province of Manitoba in September 2012, the Project area lies within Métis Natural Resource Harvesting Zone 33 and 35a.

Most of the land in the PDA has been developed for agricultural or residential use, although there are riparian areas near the Roseau River Anishinabe First Nation Reserve. The reserve consists of two parcels of land that make up a total of 3,066 ha. The largest piece of land, approximately 2,135 ha, is located 4 km east of PTH 75, adjacent to the Red River on PR 201, and the other 930 ha, known as Roseau River Rapids, located on the Roseau River, 5 km east of PR 218 and 4 km north of PR 201.

Available information from Aboriginal Affairs and Northern Development Canada and the Treaty Land Entitlement Committee of Manitoba Inc. (www:tlec.ca) indicate that there are no current outstanding treaty land entitlement claims within the PDA for either Roseau River Anishinabe or Peguis First Nation.

Project Environmental Effects on Traditional Land Use and Resource Use

Potential environmental effects of all Project-related activities on traditional land use and resource use were ranked as 0 or 1 in Table 9.9-1; therefore, no determination of significance of residual or cumulative environmental effects are conducted for this VC.

Residual environmental effects to Traditional Land Use and Resource Use would be limited to areas of Crown Land or those areas of private land where hunting, trapping, berry harvesting and plant collection are permitted. The environmental effects identified for Aquatic Resources (Section 9.3) and Wildlife, such as Birds (Section 9.6), and Mammals (Section 9.7) would, to a certain extent, also apply to Traditional Land Use and Resource Use.

9.9.4.3 Mitigation

Mitigation measures to minimize the effects of the Project on Aquatic Resources and Wildlife would also serve to mitigate the effects on Traditional Land Use and Resource Use. Implementation of a 30 m buffer zone in riparian areas is another mitigative measure. An access management plan will be developed for the Project.

Manitoba Hydro is continuing engagement with Peguis First Nation, Roseau River Anishinabe First Nation and the Manitoba Metis Federation. Manitoba Hydro will offer to hold Environment Protection Program meetings with communities that have expressed an interest in receiving updates on the Project.

Furthermore, there is discussion about the Manitoba Métis Federation potentially conducting a Traditional Land Use and Knowledge Study , described in Section 7.4.3.2.3 of this EA, which may provide information that could be included in the Environmental Protection Plan for the Project. Manitoba Hydro will continue to engage with the Manitoba Metis Federation to share information and address potential concerns related to this Project.

9.9.4.4 Characterization of Residual Effects on Traditional Land Use and Resource Use

The environmental effects of the Project on traditional land use and resource use, specifically traditional sites, will be greatest during the construction phase and will consist of short-term clearing, drilling, tower installation and marshalling yards. As the number of previously recorded sites within the PDA and LAA are limited, there are limited potential effects for disturbance.

The effects of operation and maintenance activities on traditional land use and resource use will be minimal, as the primary effect is vegetation control. Potential effects are not expected to be a concern as the effects will be short-term in duration, intermittent in nature (consistent with fluctuations in construction effort and clearing program intensity), and localized.

9.9.5 Cumulative Environmental Effects on Traditional Land Use and Resource Use

The Project's residual environmental effects on traditional land and resource use are expected to be minimal, given the limited potential for and short duration of interactions. Other projects or activities that may affect traditional land and resource use in the same area and time frame as those of the Project are primarily agricultural related. The combined environmental effects of the Project with those of other projects and activities are expected to be of low magnitude, short term and reversible. The Project's contribution to cumulative effects is not expected to be discernible.

9.9.6 Follow-up and Monitoring

Follow-up or monitoring will occur as needed for the project.

9.9.7 Summary

The potential effects of the Project on traditional land and resource use are rated as not significant. Available information indicates that there is minimal Crown Land within the PDA, LAA and RAA where Traditional Land Use and Knowledge Study can be conducted.

9.10 INFRASTRUCTURE AND SERVICES

This Infrastructure and Services section provides an overview and assessment of the provincial, municipal and privately operated infrastructure and services near the Project. This includes transportation, community services, emergency services, and health services and facilities. Infrastructure and services was selected as a VC in recognition of its importance to residents and communities within the RAA. Potential effects to infrastructure and services include effects from increased traffic on transportation and infrastructure (including damage or disruption), increased pressure on utilities and emergency services, and the potential for interference with communication and transmission signals. However, Project activities are not anticipated to have significant residual adverse environmental effects on infrastructure and services due to the implementation of specific management strategies as discussed below. The basis for this conclusion is provided in the following sections.

9.10.1 Scope of Assessment for Infrastructure and Services

9.10.1.1 Regulatory Setting

The scope of the assessment for infrastructure and services is based on the requirements for applications under s.11 of the *Manitoba Environment Act*. Specifically, the assessment was prepared to meet the filing requirements and guidance for socio-economic effects.

9.10.1.2 Boundaries

The temporal boundaries for the assessment of potential environmental effects on infrastructure and services include the periods of construction and operation and maintenance of the Project; see Section 3.7 for the Project construction schedule. Operation and maintenance of the Project will begin following construction and will be carried out until project decommissioning.

The spatial boundaries for the environmental effects assessment of infrastructure and services include the Project Development Area (PDA), Local Assessment Area (LAA) and Regional Assessment Area (RAA).

The PDA is defined as the area within which all construction activities associated with the Project will take place. For this Project, the PDA constitutes a 64-m wide ROW south of St. Vital Station to the City of Winnipeg limits, a 40-m wide ROW between the City and Letellier Station, and a 34-m-wide ROW for the Southern Loop corridor emanating from La Verendrye Station.

The LAA is defined as the PDA area plus an additional 1 km buffer adjacent to the ROW on either side for a 2-km corridor. The LAA is the area where indirect or secondary environmental effects of construction and operation and maintenance are likely to be most pronounced or discernible.

The RAA is defined as the municipal jurisdictions traversed by the Project – the RMs of De Salaberry, Franklin, Hanover, MacDonald, Montcalm, Ritchot and Tache, specifically and the neighbourhood communities of Fort Garry, St. Vital and St. Boniface (within the City of Winnipeg).

The RAA is the area within which cumulative environmental effects for Project construction and operation and maintenance may occur. This spatial boundary was chosen to correspond to the rural municipal boundaries within which the Project traverses.

The technical boundaries for this assessment are based on information available through federal, provincial, and municipal government databases and information provided by individuals through the Public Engagement Program.

9.10.1.3 Identified Issues and Concerns

Concerns regarding the environmental effects of the Project on infrastructure and services were identified during the PEP. Potential issues and questions associated with the potential effects of the Project on infrastructure and services are primarily associated with routing and how the eventual presence of the transmission line may overlap physically with existing infrastructure. Comments included the following issues and concerns:

- Transmission line alignment in general.
- Highway crossings.
- Proximity to landfills, lagoons and cemeteries.
- Proximity to runways, particularly those used by aerial applicators.

9.10.2 Project Interactions with Infrastructure and Services

Table 9.10-1 lists each Project activity and physical work for the Project, and ranks each interaction as 0, 1, or 2 based on the level of interaction each activity or physical work will have with infrastructure and services.

Table 9.10-1: Project Interactions with Infrastructure and Services

Project Activities and Physical Works	Potential Environmental Effect	
	Increased Demands on Infrastructure and Services	Interference with Communications and Radio Transmission Signals
Construction:		
Clearing	1	0
Drilling	2	0
Marshalling Yards	1	0
Tower Installation	2	0
Stringing Conductors	2	0
Presence of Materials and Equipment	2	0
Site Reclamation	1	0
Operation and Maintenance:		
Project Presence	1	1
Maintenance of Infrastructure	1	0
Vegetation Management	1	0

KEY:

Project-related Environmental Effects were ranked as follows:

0 = No interaction.

1 = Interaction may occur; however, based on past experience and professional judgment, the resulting environmental effect is well understood and can be managed to acceptable levels through General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). No determination of significance of residual effects or cumulative effects assessment is warranted.

2 = Interaction may occur, and the resulting environmental effect may exceed acceptable levels without implementation of project-specific mitigation. Further assessment is warranted.

9.10.2.1 Justification and Rationale for Interactions Ranked as 1

Construction activities ranked as 1, including clearing of the ROW, establishing marshalling yards, and site reclamation can be managed and mitigated using standard Manitoba Hydro construction practices. In terms of operation, change in demand on infrastructure and services is rated 1 because of the small and localized workforce involved that will put minimal additional demands on transportation infrastructure and local services. Interference with communication and radio signals is not expected given adherence to applicable Project design standards and was also rated as 0 or 1.

9.10.2.2 Selection of Environmental Effects and Measurable Parameters

The environmental assessment of infrastructure and services is focused on the following environmental effects:

- Increased demands on infrastructure and services
- Interference with radio and communications

In this section, the environmental effects of Project activities on infrastructure and services resulting from all phases of the Project are assessed.

Table 9.10-2 provides the measurable parameters of the selected environmental effect, and the rationale for selection.

Table 9.10-2: Measurable Parameters for Infrastructure and Services

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Increased Demands on Infrastructure and Services	Changes in demand on local and regional services (emergency and health facilities).	The Project could potentially increase the demand on local services and infrastructure.
	Change in traffic volumes during construction. Interruption of and access to existing roads and rail.	The Project may result in changes to traffic volumes on roads within the RAA.
Interference with Radio and Communications	N/A	High voltage transmission systems may have localized effects on television and radio signals in their immediate vicinity.

The selection of measurable parameters in Table 9.10-2 was based on the professional judgment of the Study Team and the results of the PEP.

9.10.3 Residual Environmental Effects Description Criteria

Parameters listed in Table 9.10-3 below are used to characterize and evaluate residual environmental effects of the Project on infrastructure and services.

Table 9.10-3: Characterization of Residual Environmental Effects on Infrastructure and Services

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The ultimate long-term trend of the environmental effect	**Positive** –an improvement in the capacity and condition of infrastructure and services or a reduction in radio / communication interference.
		Adverse – a decrease in the capacity and condition of infrastructure and services or an increase in radio / communication interference.
		Neutral – no net change in the capacity and condition of infrastructure and services or in radio / communication interference.
Magnitude	The amount of change in a measurable parameter or variable relative to baseline case	**Negligible** – no measurable change in the capacity of infrastructure and services or current radio / communication interference levels.
		Low – a minor measureable change that does not exceed the capacity of infrastructure and services or current radio / communication interference levels.
		Moderate – a measurable change that does not exceed the capacity of the infrastructure and services or current radio / communication interference levels.

Table 9.10-3: Characterization of Residual Environmental Effects on Infrastructure and Services		
Characterization	**Description**	**Quantitative Measure or Definition of Qualitative Categories**
		High – a measurable change that exceeds the capacity of infrastructure and services or current radio / communication interference levels.
Geographical Extent	The geographic area in which an environmental, economic, social, heritage, or health effect of a defined magnitude occurs	**PDA** – effects are restricted to PDA
		LAA – effects extend into LAA
		RAA – effects extend into RAA
Duration	The period of time required until the VC returns to its baseline condition, or the effect can no longer be measured or otherwise perceived	**Short-term** – effects restricted to the construction phase
		Medium-term – effects extend through the operation phase
		Long-term – effects extend for the life of the Project
		Permanent – measurable parameter unlikely to recover to baseline
Frequency	The number of times during the Project or specific Project phase that an environmental effect may occur	**Occasionally** – once per month or less
		Sporadic – once per week
		Regular – more than once per week
		Continuous – regularly throughout the life cycle of the Project
Socio-economic Context	The resilience or ability of an environment to accommodate change	**Low** – environment less able to accommodate change
		Moderate – well developed and functioning systems in place that are able to accommodate some change
		High – well developed and functioning systems able to accommodate changes
Likelihood of Significant Effect	The likelihood that a significant effect will occur if the assessment has made a conclusion of significance for a VC	**Low** – a low probability of the significant effect occurring
		Medium – a medium probability of the significant effect occurring

Table 9.10-3: Characterization of Residual Environmental Effects on Infrastructure and Services

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		High – a high probability of the significant effect occurring

9.10.3.1 Significance Thresholds for Residual Environmental Effects

A significant residual adverse environmental effect on infrastructure and services is one where Project activities will result in: a) demand exceeding the capacity of those systems, and/or b) interference with radio or communication signals beyond current levels for an extended time.

9.10.4 Existing Conditions for Infrastructure and Services

This section presents a high-level summary of information on existing conditions of infrastructure and services. For a detailed description of baseline conditions, see Section 6.4.7.

9.10.4.1 Baseline Data Sources

Methods and sources of information used to characterize the baseline conditions for infrastructure and services included:

- Publicly available databases and websites (e.g., MIT for highway traffic count data)
- GIS spatial data and analyses
- Statistical information from Statistics Canada
- Provincial databases of recreational sites and reserves
- Information collected during the PEP

Baseline data were collected from a variety of government and industry sources. Table 9.10-4 summarizes the objectives, methods, and data sources.

Table 9.10-4: Baseline Research Methods for Infrastructure and Services

Baseline Component	Objective and Outcome	Data and Approach
Transportation and Community Infrastructure and Services	Describe transportation infrastructure and current level of use. Including description of road conditions, level of use, and description of non-ground related transportation infrastructure (i.e., airport and rail).	Review of Manitoba Highway Traffic Information System and relevant municipal websites.
Community and Emergency Services and Infrastructure	Describe education, health and social services, emergency and protection services.	Review local, regional, and planning documents from agencies and the various municipalities within the RAA.

9.10.4.2 Baseline Overview

A description of baseline conditions follows for:

- Infrastructure (transport and utilities)
- Emergency and Health Services

9.10.4.3 Infrastructure

Roads and Rail

The lands traversed by the Project can be accessed by Provincial Trunk Highways (PTH), Provincial Roads (PR) and mile or half mile roads. Key highways and roads include (Map 9-6):

- PTH 2 – runs east-west from Oak Bluff to Starbuck.
- PTH 3 – runs southwest from Oak Bluff to Sanford and beyond.
- PTH 23 – runs east-west from PTH 59 to Morris.
- PTH 52 – runs east-west from Steinbach to PTH 59 within the RSA.
- PTH 59 – runs north-south in southern Manitoba
- PTH 75 – runs north-south in southern Manitoba and dissects the southwestern most portion of the RSA.

- PR 201 – runs east-west throughout the southern portion of the RSA and passes through Letellier.
- PR 216 – runs north-south from PTH 52 to PTH 59.
- PR 207 – runs from Deacon's Corner along the northeast portion of the study area to Ste. Anne.
- PR 405 – runs east-west from PR 206 to PR 300.
- PR 206 – runs north-south within the study area from Highway 1 to PTH 52.

PTH 75 is classified as a Regional Transportation Advisory Committee (RTAC) route which has a maximum prescribed gross vehicle weight of 63,500 kg. PTH 3, 52 and 59, and PR 207 and 405 are classified as RTAC routes which have a maximum prescribed gross vehicle weight of 62,500 kg. PR 206 is a seasonal RTAC route from December 1 to any year ending on the last day of February in the ensuing year. PTH 23 and PR 216 are classified as Class A1 highways and have a maximum prescribed gross vehicle weight of 56,500 kg. PR 201 is classified as Class B1 and has a maximum prescribed gross vehicle weight of 47,630 kg (*The [Manitoba] Highway Traffic Act*). In addition to the above highways and roads, the majority of the rural areas are also connected by a square mile grid or dirt roads which are maintained by the respective RMs.

There is potential for future development in proximity to the proposed transmission line, notably the twinning of PTH 59 and PTH 52. PTH 59 runs south of Winnipeg and intersects with the proposed Project route three times. PTH 52 runs east from PTH 59 and intersects with the proposed Project route once. The Province is also working on the rehabilitation of PTH 75 from Winnipeg to the Emerson border crossing to address perennial flooding concerns associated with the Red River (MB Infrastructure and Transportation 2011). PTH 75 is intersected by the proposed Project route once south of Letellier.

CN has a station located in Lorette (on a line running southeast into the United States) and a station located in St. Jean Baptiste and Letellier on a line running south from Winnipeg to Emerson (CN Rail 2013). A CP rail line runs north-south from Winnipeg to Emerson with stations located in Grand Pointe, Dufrost, Arnaud and Dominion City (CN Rail 2013). A second CP rail line runs south between Winnipeg and Morris along PR 330.

Other infrastructure in the RAA as discussed below includes:

- Hydroelectric transmission and distribution lines.
- Natural gas and oil pipelines – the proposed transmission line will intersect a TransCanada natural gas pipeline just south of the City of Winnipeg and a north-south Winnipeg Oil pipeline that extends south from the city of Winnipeg to the US border.

- Aerodromes, airports and airstrips (discussed in greater detail below).
- Communication facilities/towers, including microwave and cellular towers.

During the PEP, including the Aboriginal engagement process, comments were made with respect to locating transmission line infrastructure adjacent to linear infrastructure, such as provincial highways and roadways, municipal roads and drains in order to reduce land requirements and for ease of access. Existing corridors and linear feature were identified as route opportunities in the route selection process and are being utilized where possible. In addition, comment was received to minimize transmission line crossings of major highways and rail lines. Such crossings, which require higher and more costly towers, were minimized where possible.

Airports

The nearest major national and international airport to the RAA is the Winnipeg James Armstrong Richardson International Airport. There are eight other aerodromes / airstrips located throughout the RAA. Airstrip locations were identified and avoided where possible in final route selection. An aerodrome located near St. Pierre-Jolys is located in proximity to the final preferred route. During the PEP the airstrip operator expressed concerns to Manitoba Hydro with respect to the proposed transmission line route affecting flight paths and access. Three potential alternatives were reviewed by Manitoba Hydro and an alignment located one mile east of the edge of the quarter section was incorporated as part of the final preferred route. There were additionally five privately owned airstrips identified during the public engagement program. These were located on SE-8-5-4E, SW-23-6-4E, NE12-6-4E, NE-4-8-4E and NW15-5-4E. An additional airstrip owned in the St. Jean-Baptiste area was avoided during the siting process. North of the final preferred route through the Southern Loop corridor, there is one other private airstrip located in SE21-9-2E. Dale Air Services, based in Morris provides agricultural services to farmers in the locality.

Utilities

There are six existing transmission lines that cross through the RAA, including: two 230-kV transmission lines from La Verendrye to Letellier (Y5TL) and Stanley (outside the RAA) to Letellier (S60L); two 115 kV transmission lines (VT63 and VJ50) from St. Vital Station in the City of Winnipeg to Ile des Chênes (TransCanada Pipeline Compressor Station), and Randolph and Hanover Stations in the Linden and Steinbach areas, respectively; and two other 115-kV transmission lines (YF11 and YM31) commencing at La Verendrye Station to Rosenfeld and Morden, respectively (outside of the RAA).

The St. Joseph Wind Farm is located in the RM of Montcalm around the community of St. Joseph. The power plant covers about 125 square kilometres west of Highway 75.

TransCanada Pipelines maintains its mainline natural gas pipeline through the RAA, crossing south of the city of Winnipeg to Ile des Chênes, linked to a series of compressor stations, including at Landmark. TransCanada Pipelines Ltd. has a second mainline that runs between the city of Winnipeg and Emerson. Manitoba Hydro/Centra Gas maintains a network of its own natural gas distribution pipelines in the RAA, including lines between Winnipeg, Ile des Chênes and Niverville, between Winnipeg, Oak Bluff and Sanford and from Winnipeg to La Salle. Other Manitoba Hydro/Centra Gas pipelines run between Ile des Chênes and New Bothwell, Niverville to Ste. Agathe and Kleefeld, between Otterburne, St. Pierre Jolys and Grunthal, and between Dufrost and St. Malo. The Winnipeg Oil Pipeline runs south from the City of Winnipeg through the RM of Ritchot in the RAA, just west of Ile des Chênes, to St. Adolphe and beyond.

Communication Facilities

Communication facilities/towers, including microwave and cellular towers can be found across southern Manitoba. These are maintained by telephone communication companies, broadcast companies and radio stations and corporations, the Government of Canada, Provincial and municipal governments and utility companies. There are approximately 848 communication towers and broadcast antenna locations in the RAA.

Municipal Water and Solid Waste Disposal Facilities

The regional water distribution system in the RM of Ritchot utilizes groundwater sources from an aquifer in the RM of Hanover near New Bothwell. In the RM of Macdonald, water is supplied from the La Salle River. In addition, an extensive network of rural water pipelines has been developed to serve the RMs of Ritchot and Macdonald, including a water treatment plant located at Sanford.

All areas within the RM of Franklin and RM of Montcalm are served by a municipal water system. Water is supplied by the Pembina Valley Water Cooperative and also from community wells throughout the region. There is a water treatment plant in Letellier through which water is distributed to rural areas and towns via a pipeline network. There is a public sewer system at Dominion City, but there is no other sewage infrastructure for the remainder of the municipality. Similarly, there is a public sewer system for St. Joseph, St. Jean-Baptiste, and Letellier only in the RM of Montcalm.

The RM of Ritchot's community waste management facility is located south of Leclaire Road, north of Twin Creek Road southwest of Ile des Chênes. Operated by MidCanada, new cells of the community landfill have already begun taking in waste.

Two sewage lagoons are located northwest of Ste. Agathe and south of Ile des Chênes in the RM of Ritchot. In the RM of Hanover, there are two sewage lagoons north of New Bothwell and north of Niverville. There is a site for waste disposal within the RMs of Franklin and Montcalm (near St. Jean Baptiste and Letellier). Miller Environmental Corporation operates a waste treatment and recycling facility in the municipality of Montcalm.

During the PEP, public comments received included the need to avoid landfills and lagoons. Locations of landfills and lagoons were noted in the route selection process. Manitoba Hydro has indicated that structure placement will avoid these areas.

At one particular location, the proposed final route traversed a community waste management facility operated by MidCanada for the RM of Ritchot, located southwest of Ile des Chenes. Current use and expansion and operation of new landfill cells within the facility would have made traversing the facility difficult. The RM of Ritchot requested that options be reviewed which would avoid facility and future expansion of the municipal lagoons. Manitoba Hydro reviewed the alignments in the area and a route option was identified crossing along the northern boundary of the facility and then traversing south along the east side of the lagoon. The modified alignment was incorporated as part of the final preferred route through this area.

Floodway System and Flood Protection

The Red River Floodway is located on the south and east sides of the City of Winnipeg. The current Floodway system includes the floodway inlet, floodway channel, west dike, and floodway outlet. The west dike, at 45 km (27 mi.), is located south of Winnipeg, providing flood protection for the City and preventing Red River floodwaters from flowing in the La Salle River and then entering Winnipeg.

A good portion of the Project falls within the Red River Valley Designated Flood Area. There are 10 community ring dikes in the Red River Valley portion of the RAA providing flood protection up to 1997 flood levels. The communities with ring dikes are: Grande Pointe, St. Adolphe, and St. Agathe in the RM of Ritchot; Niverville in the RM of Hanover; St. Pierre-Jolys in the RM of De Salaberry; Dominion City and Roseau River in the RM of Franklin; and Emerson, Letellier and St. Jean-Baptiste in the RM of Montcalm.

Comment was expressed during the PEP that the Project area included some areas that are flood prone. Manitoba Hydro indicated that the potential for flooding was taken into account but does not hinder the design, construction or operation of transmission lines.

9.10.4.3.1 Emergency and Health Services

The following provides a general description of the various community services available in the RAA. These services include: Fire services, Ambulance services, Police services, and Health and Social services.

The City of Winnipeg provides residents with all the above services. The closest community hospital is Victoria General Hospital, a 203 bed acute care facility, located in South Winnipeg along Pembina Highway in Fort Garry. St-Pierre-Jolys and Niverville have their own ambulance, fire department and RCMP detachments. St-Pierre-Jolys also has a District Health Centre.

All RMs within the RAA provides fire services. The RMs of Ritchot, Hanover and De Salaberry, also provide ambulance services. The remaining RMs rely on ambulance services provided by neighboring municipalities. Local fire and emergency medical services in the RMs of Franklin and Montcalm are provided by volunteer fire departments based out of Dominion City, St. Jean-Baptiste and Letellier.

Municipalities with no police detachments (RMs of Franklin and Montcalm) are provided police protection through other nearby RCMP detachments in Emerson, St. Pierre Jolys, and Morris. St-Pierre-Jolys and Niverville have their own ambulance, fire department and RCMP detachments.

South Eastman Health (which includes the RMs of Ritchot, Tache, Hanover, De Salaberry and Franklin) owns and operates one hospital in the region, located at St. Pierre-Jolys in the RM of De Salaberry. Other care facilities include personal care homes associated with a regional hospital in St. Pierre-Jolys, and two other facilities in Grunthal and St. Adolphe, and a home care site in Dominion City. The primary health care centre in the region is located in Niverville. Family physicians are based in St. Pierre-Jolys. The Central Region, which comprises the RMs of Macdonald and Montcalm, operates a medical centre in La Salle and a public health centre in Sanford. In St. Jean Baptiste, health service sites include a public health centre, home care and a medical clinic.

9.10.5 Project Environmental Effects on Infrastructure and Services

Only the interactions ranked as 2 in Table 9.10-1 are further assessed with respect to residual and cumulative effects and determination of significance further in the assessment of Project-related environmental effects.

9.10.5.1 Assessment of Infrastructure and Services

9.10.5.1.1 Construction and Operation Effects: Increased Demands on Infrastructure and Services

The Project will be similar to other existing transmission infrastructure in the province. Manitoba Hydro will use standard practices and procedures and will comply with applicable regulatory requirements during Project construction. The Project will be constructed under the guidance of internal policies, regulatory authorities and government departments and agencies. Manitoba Hydro will work with government departments and agencies before and during construction to facilitate planning and preparation for Project activities.

Transportation, Utilities and Facilities

Project-related effects from construction associated with the movement of equipment, workers and goods and services have the potential to increase use of existing transportation infrastructure and facilities. Increased traffic volumes along local or regional road networks could affect travel times and reduce road safety. The presence of heavy equipment to carry out the construction activities may also have effects on infrastructure and services.

Access to land within the RAA for the transportation and distribution of personnel, equipment and materials to the work areas is a key requirement. Therefore, roads will be used throughout the RAA for transportation as needed. All goods and materials will be delivered by truck and will likely involve frequent movements of extra heavy or wide load trucks. Transportation during construction may result in increased congestion and/or road maintenance requirements along public and private roadways within the RAA. In some instances, the Project will cross existing infrastructure. Access to the LAA will be via access trails and roads established from existing roadways to select points along the ROW. At strategic points along the ROW and at other key sites, marshalling yards will be established to receive and temporarily store materials and equipment for use in Project construction. The Project route crosses roads of varying types and surfaces a total of 22 times (Map 9-6). As a result, there may be temporary disruptions to traffic during Project construction. The following roads are intersected by the Project:

- PTH 2, 3, 23, 52, 59, 75 (Pembina Highway) and 100
- PR 200, 201, 205, 210, 217, 300 and 330.

The Project route also traverses three rail lines (CEMR, CNR and CP) on seven occasions; various transmission lines on five occasions; crosses in proximity to municipal lagoons on two occasions at NW17-9-2E and SE32-8-4E, crosses main oil and gas pipeline on six occasions, crosses in proximity to communications towers on six occasions.

Railways affected by the proposed route will require review and approval of engineering design drawings related to rail cable crossings of their ROW. Consultation with the railway operations will be important with respect to the scheduling of activities (i.e., where and when) during Project clearing, construction, and operation and maintenance phases. It is likely that TransCanada Pipelines Ltd. and other pipeline owners will require discussion with Manitoba Hydro on what mitigation measures would be required to ensure the safe operation of their pipelines. This would likely occur following the detailed design of the transmission line. It is expected that any potential interference would be completely mitigated at all crossings. Manitoba Hydro generally does not anticipate there being any potential adverse effects on communication towers from the construction and operational phases of the Project.

The proposed Project also crosses in proximity to one registered aerodrome (CPJ6) east of St. Pierre-Jolys in SE36-5-4E. The proposed route is approximately 690 m to the east of the airstrip (north-south) and approximately 1.2 km south of the airstrip (east-west). A review of the proposed route will likely be required by Transport Canada based on their navigation standards to confirm that no adverse effects on registered aerodrome operations would result. Due to the proximity and orientation of the final preferred route to the airstrip noted above, there is potential for interference from construction and operational phases of the Project.

The final preferred route avoids the community waste management facility operated by MidCanada for the RM of Ritchot, located southwest of Ile des Chenes. Manitoba Hydro identified a route option for the transmission line crossing along the northern boundary of the facility and then traversing south along the east side of the lagoon through this area.

The final preferred route crossing of existing transmission lines, including 230-kV and 115-kV transmission lines, can be effectively mitigated through application of transmission line design measures. The proposed 230-kV transmission line will be subject to two general standards (C22.3 No. 1-10 “Overhead Systems” standard and CAN/CSA-C22.3 No. 60826-10 “Design Criteria of overhead transmission lines” standard). Necessary clearances for the crossings will be determined by Manitoba Hydro and will meet or exceed the minimum values specified in the CSA standard.

Reviews of potential effects and appropriate mitigation measures involving these types of infrastructure are generally subject to Manitoba Hydro procedures for contact and consultation with responsible authorities or companies and are mitigable in all cases. Manitoba Hydro will adhere to its Project Environmental Protection Plan related to clearing and construction activities as well as all applicable design specifications related to infrastructure crossings, including any special requirements or mitigative measures.

It is anticipated that a workforce of up to 100 will be required for the Project for the construction period who would be utilizing the transportation network and who would be predominantly drawn from within the RAA. Construction camps and ancillary accommodation are, therefore, not necessary for this Project. The scale and relatively small geographic scope of this Project allows workers to return home at the end of every working day.

Station Modifications and 230 kV Transmission Lines

The following provides an indication of some of the heavy equipment, materials and supplies that may be required to be transported to and within the RAA during Project construction:

- Excavators, cranes and bulldozers
- Conductor wire
- Insulators
- Steel towers and steel lattice foundations
- Optical overhead groundwire (OPGW) and counterpoise wire
- Diesel fuel
- Station components, including 230 kV circuit breakers, current transformers, switching gear, power transformers, steel structures and foundations.

For construction purposes, Manitoba Hydro will use existing highways, municipal roads, trails and man-made linear features where possible as access points, thereby minimizing the need to develop new access routes to the ROW. Access is required along the ROW and will be restricted to the ROW as much as possible, with deviations from the ROW limited to natural terrain features such as where ingress and egress to stream crossings are logistically challenging and/or environmentally risky.

Most traffic will originate in Winnipeg, from where materials, equipment and a portion of the workforce will be distributed throughout the RAA and LAA. Project-related traffic effects will be mainly experienced at arrival points. Roads in these areas are designed to accommodate higher truck traffic volumes with good access to main highways. Elsewhere, incremental traffic volumes on particular highway legs will decrease the further from the arrival points that vehicles must travel (i.e., items destined for the southern portion of the LAA will use PTH 59, but at some point some traffic may be diverted towards marshalling yards along this route).

During the PEP, concerns were identified related to the disruption of traffic, particularly related to emergency services from construction activities.

9.10.5.1.2 Mitigation

Mitigation of potential Project effects on ground transportation includes the following:

- Manitoba Hydro will meet with various authorities, such as Manitoba Infrastructure and Transportation of (MIT), to discuss future planning before finalizing alignments near PTH 59, PTH 52 and PTH75, and possible mitigation strategies. Manitoba Hydro will also continue to consult with local government in affected areas throughout the RAA.
- Where the Project crosses utilities and other infrastructure, appropriate affected parties, including TransCanada Pipelines; affected RMs; CEMR; CNR; CP and Manitoba Telecom Services (MTS) will be engaged by Manitoba Hydro to identify and address their concerns.
- Discussion will occur with the operator of the registered airstrip with respect to potential for adverse effects on operations. The operator will be informed regarding clearing and construction schedules for the proposed transmission line. Possible mitigation can include the installation of aviation markers on the new 230 kV transmission line.
- To access the ROW from the main highways, existing access roads will be used wherever possible, with upgrades as required.
- Where there is potential for traffic slowdowns as a result of a temporary increase in Project activity, Manitoba Hydro will advertise these details to advise motorists of potential slowdowns and, where possible, these activities will be conducted to avoid periods of peak traffic.
- Construction traffic routes and detours will be identified and made available to local police, fire and emergency services.

- All-related movements will be subject to regulations governing load restrictions and transportation of dangerous goods.
- All traffic operations will be conducted in accordance with provincial legislation, including the (Manitoba) *Highway Traffic Act*, which regulates the weight and dimensions of highway vehicles within the province.

Specific construction traffic volume estimates are not available at this stage. While it is expected that the Project will generate additional traffic, it is anticipated to be only a small percentage of the total annual traffic for any one highway segment, and is not expected to result in a substantially increased use of highways within the RAA relative to the current use.

Community Infrastructure and Services

The presence of workers during construction has the potential to increase the demand for community and emergency services (e.g., use of waste disposal areas).

In the absence of Project-related in-migration, limited or no demand will be placed on local infrastructure and services such as education, health, and social services. Given the relatively modest amount of workers required for construction (100 during peak), it is anticipated that there will be limited additional demand for community infrastructure and services during the construction phases. Existing community infrastructure and services can accommodate the small and temporary day-time increase in people.

Workforce injuries during construction could require assistance from emergency and medical services. From 2000 through 2012 the average rate across the province of workplace injuries was 7.9 per 100 full-time workers (Safe Work Manitoba 2000-2012). The provincial time loss injury rate fell from a high of 5.6 time loss injuries per 100 workers in 2000 to 3.3 in 2012. This is a drop of 41% over the period. Based on these rates and the fact that the workforce will consist of a maximum of 100 people during peak-construction, only a small number of Project workers would likely be injured in any given year. As Manitoba Hydro will maintain first aid facilities at the Project sites along the ROW to deal with all but the most serious injuries, the incremental demand placed on emergency and medical facilities in the RAA will be very low. In the event of an accident involving serious injuries, patients would be transferred to the nearest major hospital. Consequently, there will be minimal use of the RAA medical facilities.

The Key Person Interviews conducted for the PEP focused on different sectors, including government infrastructure, health, and municipal sectors. Respondents from the government infrastructure sector did not expect that emergency services would be affected by the Project. One respondent from the health sector felt the Project would have effects on emergency services due to road closures which could affect response times. There is one regional hospital as well as four other public health care centres in the RAA, outside of Winnipeg. Emergency response equipment and trained personnel will be on-site during construction. In addition, an Emergency Response Plan (ERP) will be developed by the Contractor. Manitoba Hydro will work with local emergency response agencies in the area to ensure appropriate emergency response times are maintained. In accordance with provincial regulations, the Contractor will be required to maintain firefighting trained workers and fire suppression systems at construction sites. Incremental demand placed on local firefighting services is anticipated to be negligible.

It is likely that the police services in the RAA have the capacity to handle demands created by the short-term presence of a relatively small number of workers (100 during peak). Manitoba Hydro will maintain a zero tolerance for drug or alcohol use on its construction sites. These measures will help to minimize the need for RAA police services.

For mitigation of potential Project effects on services, the Contractor will have an ERP and on-site first aid in addition to having fire-fighting and security procedures. Mitigation measures include:

- All Project personnel will be made aware of the ERP and designated staff will receive ERP training. Among other elements, the plan will address handling and storage of materials, driving safety, animal encounters, emergency response communications, spill response, personnel injury response and vehicle accidents. The plan will describe response measures for major medical emergencies and include procedures for emergency response coordination with local emergency response personnel and local medical facilities.
- First Aid – Manitoba Hydro and its contractors will meet or exceed the requirements of *Manitoba Workplace Safety and Health Act*. Manitoba Hydro will provide first aid supplies and facilities, and trained first aid personnel to deal with minor injuries. In the case of major injuries, medical aid will be summoned and/or evacuation via land or air ambulance to medical facilities will be undertaken.

Table 9.10-5, provides summary of potential construction effects, appropriate mitigation and residual effects.

Table 9.10-5: Transportation and Community Infrastructure and Services – Summary of Potential Construction Effects, Mitigation and Residual Effects

Potential Effect	Mitigation	Residual Effect
Potential for damage to local roads	• Construction will adhere to applicable road restrictions. • Manitoba Hydro will communicate with appropriate parties regarding construction activities and schedule, including MIT and the RMs.	Minor damage to roads
Potential for disruption to traffic	• Manitoba Hydro standard procedures to be followed when construction is undertaken adjacent to roads and where it crosses roads. This will include proper workplace health and safety measures (e.g., signage) as well as	Minor disruption to traffic

Table 9.10-5: Transportation and Community Infrastructure and Services – Summary of Potential Construction Effects, Mitigation and Residual Effects

Potential Effect	Mitigation	Residual Effect
	undertaking construction at crossings at non-peak traffic times (for high volume routes). • Contact and engagement with relevant stakeholders (e.g., MIT and RMs), including notification regarding construction schedules. • Applicable design specifications associated with infrastructure crossings will be respected and appropriate mitigation will be applied as required.	
Potential for damage to municipal infrastructure and pipelines	• Siting will be undertaken to avoid potential damage or disruption to municipal infrastructure. • Contact and engagement with relevant stakeholders (e.g., RMs), including notification regarding construction schedules. • Applicable design specifications associated with infrastructure crossings will be respected and appropriate mitigation will be applied as required.	Minor damage or disruption to municipal infrastructure and pipelines
Potential for damage or disruption to communications infrastructure	• Siting will be undertaken to avoid potential issues. • Contact and engagement with relevant stakeholders (e.g., MTS), including notification regarding construction schedules.	Minor disruption or damage to communication infrastructure

The majority of the likely effects of Project construction on infrastructure and services are expected to be on highways, existing facilities and emergency services. These effects may be caused by both construction activities and accidents and malfunctions. In all cases, appropriate Project design and the mitigation measures outlined above will be adopted to prevent and minimize potential adverse effects.

9.10.5.1.3 Characterization of Residual Increased Demand on Infrastructure and Services

A summary of the environmental effects assessment and prediction of residual environmental effects resulting from interactions with infrastructure and services that were ranked as 2 in Table 9.10-1 is provided in Table 9.10-6.

Construction

The likely residual effects of Project construction on infrastructure and services are as follows:

- **Direction:**
  - Project effects on infrastructure and services will be **adverse** because increased demands on highway infrastructure may contribute to additional maintenance requirements and possible safety concerns for highway users.
- **Magnitude:**
  - Considering the relatively modest amount of workers required, appropriate staff training, the implementation of an ERP and the capacity of existing infrastructure and services, Project effects on infrastructure and services are anticipated to be **low** and within the capacities of the facilities within the RAA.
- **Geographic Extent:**
  - Project effects on infrastructure and services will be **regional** and experienced on major highways and on some community roads. In addition, effects will also be **local** where they are experienced along mile roads between the main highways and the transmission ROW.
  - The Project will also result in increased demands on services within the RAA. Due to the anticipated size of the workforce, such effects are not expected to be beyond the capacity of existing facilities.
- **Duration/Frequency:**
  - Project effects will be of **short-term** duration throughout construction.
  - Project effects will be **regular** frequency throughout construction.
- **Socio-economic Context:**
  - Project effects will occur in an area of **moderate** resilience.
- **Significance:**
  - Based on the effects management measures for infrastructure and services, the amount of workforce required and Project design, Project effects are anticipated to be **not significant**.

There is a high degree of confidence that the level of effects of the Project on infrastructure and services will be as predicted due to the scale of the Project, the application of appropriate mitigation measures and past experience with similar transmission line projects.

9.10.5.2 Assessment of Interference with Communications and Radio Transmission Signals

9.10.5.2.1 Operations and Maintenance

Transmission lines are designed not to interfere with television and radio reception under normal operation. However, interference can be caused by rare events such as arcing discharges that may occur on insulators and by corona discharges on conductors under abnormal conditions. Maximum radio interference levels are specified by Industry Canada (Industry Canada 2001). Manitoba Hydro will meet the requirements of *Radio Communications Act* (R.S. 1985, c. R-2 [as amended 2007]) and the Radio Communication Regulations (SOR/96-484 [as amended 2014-04-01]). Manitoba Hydro will also meet the requirements of Industry Canada's Interference-Causing Equipment Standard – ICES-004 Issue 4, June 2013 – Alternating Current High Voltage Power Systems.

9.10.5.2.2 Mitigation

The Project will be designed and constructed to comply with Canadian Standards Association Standard CAN3-C108.3.1-M84, the same standard that is applied to AC transmission lines. This standard limits worst-case radio interference levels to 53 dB at a distance of 15 m from the high voltage conductors (Canadian Standards Association 2010). The maximum radio interference levels specified by Industry Canada as part of its spectrum management and telecommunications policy (Industry Canada 2001) will not be exceeded by the Project.

Manitoba Hydro generally does not anticipate there being any potential for adverse effects on communications and radio transmission signals from Project development. Manitoba Hydro will attempt to resolve any radio or television interference problems traceable to the new lines. Interference complaints from the public will be investigated and repairs made as needed to resolve complaints.

9.10.5.2.3 Characterization of Residual Interference with Communications and Radio Transmission Signals

The likely residual effects of Project operations and maintenance on infrastructure and services are related to radio interference and are as follows:

- **Direction:**
  - **Adverse** as there is potential for disruption/interference to communications and radio transmission signals.

- **Magnitude:**
  - Radio interference effects will be **low** in magnitude and may affect small numbers of people in the vicinity of the transmission lines.
- **Geographic Extent:**
  - Radio interference effects will be limited to people within the **LAA**.
- **Duration/Frequency:**
  - Radio interference effects may be experienced over the **long-term** and on a **continuous** basis.
- **Socio-economic Context:**
  - Project effects will occur in an area of **moderate** resilience.

There is a high degree of confidence that the level of effects of Project operations and maintenance on the infrastructure and services VC will be as predicted because Manitoba Hydro has considerable experience with construction, and operations and maintenance of transmission and distribution lines and there is a substantial amount of industry knowledge and government statistics to support the effects predictions.

9.10.5.3 Summary of Project Residual Environmental Effects on Infrastructure and Services

The residual environmental effects on infrastructure and services are predicted to be adverse and not significant (Table 9.10-6).

9.10.5.4 Determination of Significance of Residual Environmental Effects

Residual effects of the Project on infrastructure and services are those adverse effects remaining after mitigation and effects management strategies have been implemented. Significant residual environmental effects of the Project on infrastructure and services are defined here as those with the following characteristics:

- A demand exceeding the capacity of infrastructure or service systems over an extended period of time and/or an interference with radio or communication signals that can’t be mitigated.

Considering the significance definition above, no significant residual effects on infrastructure and services are anticipated. While most effects are adverse, the magnitude of those effects is low and occurring over the short-term, or mitigable to acceptable levels for potential long-term effects.

Table 9.10-6: Summary of Project Residual Environmental Effects on Infrastructure and Services

Potential Residual Environmental Effects for Project Activities and Physical Works	Proposed Mitigation/Compensation Measures	Residual Environmental Effects Characteristics							Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Socio-economic Context	Significance	Likelihood of Significant Effects	
Increased Demands on Infrastructure and Services									
Construction – foundations, structures, materials and equipment)	Meet with various authorities, such as MIT and affected RMs, to plan traffic management and discuss mitigation strategies.	A	L	R/L	ST/ R	M	N	N/A	
Interference with Communications and Radio Transmission Signals									
Operation and Maintenance – Project Presence	Comply with all applicable standard Canadian Standards Association Standard CAN3-C108.3.1-M84.	A	L	L	LT/ C	M	N	N/A	

KEY (Refer to Table 9.10-3 for definitions on the terms referenced below):

Direction: P: Positive; A: Adverse; N: Neutral

Magnitude: N: Negligible; L: Low; M: Moderate; H: High

Geographic Extent: L: Local- within the PDA/LAA; R: Regional - within the RAA

Duration: ST: Short-term; MT: Medium-term; LT: Long-term; P: Permanent – will not change back to original condition

Frequency: S: Single Event; I: Infrequent; F: Frequent; C: Continuous.

Reversibility: R: Reversible; I: Irreversible.

Socioeconomic Context: L: Low, M: Moderate, H, High

Significance: S: Significant; N: Not Significant.

Likelihood of Significant Effect: Based on literature review and professional judgment. N/A: Not Applicable L: Low, M: Medium; H: High.

9.10.6 Cumulative Environmental Effects on Infrastructure and Services

This section consists of an evaluation of the effects of the Project on infrastructure and services in combination with the effects of other projects or activities that will likely overlap spatially and temporally with those of the Project. These effects are considered in relation to the past, current and reasonably foreseeable future projects and activities listed in the table below, to evaluate the potential for the effects from the Project to act cumulatively in a manner that could affect the qualityof the VC.

The potential for interaction between the effects of the Project on infrastructure and services and the effects of other identified past, current and future projects and activities are presented in Table 9.10-7. Projects will have an interaction ranked as 0 if Project environmental effects do not overlap spatially and temporally with those of other projects and activities, and, therefore, do not have the potential to act cumulatively with those of other projects and activities. Interactions ranked as 1 are Project environmental effects that act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). Interactions ranked as 2 are those interactions where Project environmental effects act cumulatively with those of other projects and activities, and may exceed acceptable levels without the implementation of project-specific or regional mitigation.

Table 9.10-7: Potential Cumulative Environmental Effects on Infrastructure and Services

Other Projects and Activities with Potential for Cumulative Environmental Effects		Potential Cumulative Environmental Effect	
		Increased Demands on Infrastructure and Services	Interference with Communications and Radio Transmission Signals
Infrastructure Projects	PTH 59 Twinning	1	0
	PTH 52 Twinning	1	0
	PTH 75 Rehabilitation	1	0
Residential Projects	Sage Creek Residential Development	1	0
Energy Projects	Manitoba-Minnesota Transmission Project	2	1
	Bipole III Transmission Project	2	1

Table 9.10-7: Potential Cumulative Environmental Effects on Infrastructure and Services

Other Projects and Activities with Potential for Cumulative Environmental Effects		Potential Cumulative Environmental Effect	
		Increased Demands on Infrastructure and Services	Interference with Communications and Radio Transmission Signals
	St. Joseph Windfarm Project	1	1

KEY:

Cumulative environmental effects were ranked as follows:

0 = Project environmental effects do not act cumulatively with those of other projects and activities.

1 = Project environmental effects act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of beneficial management or codified practices.

2 = Project environmental effects act cumulatively with those of other projects and activities and the resulting cumulative effects may exceed acceptable levels without implementation of project-specific or regional mitigation.

9.10.6.1 Assessment of Cumulative Effects on Infrastructure and Services

9.10.6.1.1 Infrastructure Projects

Future highway expansion, the twinning of PTH 59 and PTH 52 is planned for construction in the future and will traverse the Project route. PTH 59 runs south of Winnipeg and intersects with the proposed Project three times (Map 9-6). Rehabilitation of PTH 75 to address perennial flooding concerns with the Red River is also planned. PTH 75 is intersected once by the Project. If construction phases of the projects overlap, there is potential for a small cumulative effect as highway expansion and the associated workforce could interact with the Project through increasing demands on infrastructure and services within the RAA. However, the change in the overall demand, availability and capacity of infrastructure and services for current users and affected individuals or communities resulting from the effects of the Project in combination with highway expansion and rehabilitation is not anticipated to result in a detectable additive interaction.

9.10.6.1.2 Residential Projects

Specific plans for residential development in the Project area include additional housing in the Sage Creek area within the City of Winnipeg. This development will occur on both sides of the existing Manitoba Hydro owned ROW south of St. Vital Station. This development would be expected to follow applicable municipal and/or provincial guidelines which would serve to limit interactions with and mitigate Project-related effects. Construction activities are expected to be fully mitigated and would have negligible additive interaction. Effective design mitigation applied to the Project would further serve to mitigate the potential for cumulative effects to occur.

9.10.6.1.3 Energy Projects

Transmission

Existing transmission lines within the RAA as part of the baseline include the 230 kV La Verendrye to Letellier (Y51L) and Stanley to Letellier (S60L) lines. The St. Vital to Letellier (V95L) transmission line of the Project would also terminate at Letellier Station with these existing lines in the RM of Montcalm.

The construction and operation of the proposed Manitoba to Minnesota Transmission Project (MMTP), involving the addition of one 500-kV AC line within Manitoba Hydro's identified Southern Loop corridor west and south of the city of Winnipeg, and the approved Bipole III (BPIII) Transmission Project may overlap temporally, and spatially with the phases and activities of this Project. The BPIII route crosses the Project route once, south of Niverville, Manitoba. Preliminary preferred route options have been identified for the proposed MMTP which have been the subject of its own PEP; the identified route options would use the same Southern Loop corridor as the Project and would cross over the St. Vital to Letellier (V95L) route in the RM of Ritchot within the Project RAA.

The BPIII transmission route and the proposed MMTP preliminary preferred route options near the Project will place additional demands on infrastructure and services such as roads, utilities and essential services. Clearing and construction for Bipole III in the southern portion of the route is to occur from 2016 to 2017. The Project timeline for MMTP proposes construction over the period of the final third of 2016 (September to December) through to 2020. The project schedule for the St. Vital Transmission Complex associated with transmission line construction is from July 2016 to December 2017. The potential for overlap between the Projects (i.e., coincidental movement of material and people) could occur in the final half of 2016 through to the end of 2017. Proper planning and scheduling of activities will be required, as well as the application of mitigation measures for these projects as they proceed. Therefore, the change in the overall demand, availability and capacity of infrastructure and services for current users resulting from the effects of the Project in combination with these other transmission projects and activities may result in a detectable additive interaction.

Wind Energy

The St. Joseph Windfarm is located near St. Joseph, Manitoba, west of PTH 75, south of PTH 14 and north of PR 421. This windfarm consists of 60 2.3-MW turbines and will overlap spatially and temporally with the Project RAA if the Project is constructed. As the St. Joseph Windfarm is not a linear development, construction took place in one designated site. Due to its relatively moderate size and location concentrated in one area, while considered an additive interaction, it is not anticipated that it would result in a change in the overall availability and quality of infrastructure and services for current users within the RAA.

9.10.6.2 Summary of Project Cumulative Environmental Effects on Infrastructure and Services

Projects and activities with residual adverse effects that have the potential to overlap with residual adverse effects of the Project on infrastructure and services include: the Bipole III Project and the Manitoba Minnesota Transmission Project. There is some potential for cumulative effects from these developments. Development of the Bipole III Project and the Manitoba Minnesota Transmission Project has the potential to occur concurrently with the St. Vital Transmission Complex and may potentially overlap with the demand for infrastructure and services in time and space. Potential effects are primarily associated with the construction phase. The development of the required footprints for Bipole III and Manitoba Minnesota would affect a localized area, be short-term in duration and would represent an incremental additive interaction. Potential effects associated with radio and communication interference are primarily associated with the operations phase. Any environmental effects would be localized. No additive interaction is anticipated given implementation of infrastructure design measures.

A summary of the characterization of the cumulative effects on infrastructure and services, including the cumulative environmental effects with the project and the project contribution to cumulative effects, is presented in Table 9.10-8. The characterization of cumulative residual environmental effects are considered following the mitigation prescribed to minimize project effects, as well as any follow-up and monitoring recommended.

Cumulative effects to change in infrastructure and services, including increased demand on infrastructure and services and interference with communications and radio transmission signals are not anticipated to cause an unacceptable change in infrastructure and services over the long-term and are therefore rated not significant.

Table 9.10-8: Summary of Cumulative Residual Environmental Effects on Infrastructure and Services

Cumulative Environmental Effect and Project Contribution		Cumulative Residual Environmental Effects Characteristics						Significance	Likelihood of Significant Effect
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Ecological/Socio-Economic Context		
Increased Demands on Infrastructure and Services	Cumulative Effect with Project	A	L	R/L	ST/ R	R	D	N	N/A
	Project Contribution to Cumulative Effect	A	L	R/L	ST/ R	R	D	N	N/A
Interference with Communications and Radio Transmission Signals	Cumulative Effect with Project	A	L	L	LT/ C	R	D	N	N/A
	Project Contribution to Cumulative Effect	A	L	L	LT/ C	R	D	N	N/A

KEY:

Direction: P: positive; N: neutral; A: adverse

Magnitude: N: Negligible – no measureable change in the capacity of infrastructure and services; L: Low – minor measurable change that does not exceed the capacity of infrastructure and services or current interference levels; M: Moderate – a measurable change that does not exceed the capacity of infrastructure and services or current interference levels; H: High – a measurable change that exceeds the capacity of infrastructure and services or current interference levels.

Geographic Extent: PDA: Site-specific within the Project development area; L: Local: within the LAA; R: within the RAA.

Duration: ST: Short term; MT: Medium Term; LT: Long Term; P: Permanent – will not change back to original condition.

Frequency: O: Occasionally, once per month or less; S: Sporadic, once per week; R: Regular, more than once per week intervals; C: Continuous, regularly throughout the life cycle of the Project.

Reversibility: R: Reversible; I: Irreversible.

Ecological/Socio-Economic Context: U: Undisturbed, area relatively or not adversely affected by human activity; D: Developed, area has been substantially previously disturbed by human development or human development is still present; N/A, Not Applicable.

Significance: S: Significant; N: Not Significant.

Likelihood of Significant Effect: Based on professional judgment – L: Low, low probability of occurrence; M: Medium, medium probability of occurrence; H: High, high probability of occurrence; N/A, Not Applicable.

9.10.7 Follow-up and Monitoring

Infrastructure and services are typically the responsibility of municipal, provincial and / or federal authorities with the necessary mandate and expertise. Monitoring demand on infrastructure and services and increasing or decreasing capacity as required are activities that those authorities typically undertake as part of their normal business – for example, highway-use statistics, and upgrades as necessary. However, Manitoba Hydro will continue to consult with relevant stakeholders during the construction phase.

9.10.8 Summary

Due to the scale of the Project, the amount of workers required, and the implementation of the mitigation measures described above, the Project and cumulative effects of the Project on infrastructure and services are anticipated to be not significant.

9.11 EMPLOYMENT AND ECONOMY

From previous experience and professional judgment, it is anticipated that the Project will result in modest economic benefits within the RAA. As a result, the employment and economy VC has been accorded a rank of 1 and is, therefore, not subject to the same level of assessment as VCs accorded a rank of 2.

Nonetheless, employment and economy have been identified as a VC because of its importance to the lives and livelihoods of the people within the RAA. It is anticipated that the Project will have minor beneficial effects by creating some opportunities for new employment and increased demands for goods and services. The Project, once in operation, will also benefit the southern part of the province by transmitting reliable and affordable electricity.

9.11.1 Scope of Assessment for Employment and Economy

9.11.1.1 Regulatory Setting

The scope of the assessment for employment and economy is based on the requirements for applications under s.11 of the *Manitoba Environment Act*. Specifically, the assessment was prepared to meet the filing requirements and guidance for socio-economic effects.

9.11.1.2 Boundaries

The temporal boundaries for the assessment of the potential environmental effects of the Project on employment and economy include the periods of construction and operation and maintenance of the Project; see Section 3.7 for the Project construction schedule. Operation and maintenance of the Project will begin following construction and will be carried out until project decommissioning.

Given the nature and scale of the Project, likely effects on employment and economy are assessed primarily at the regional (RAA) level, corresponding to those municipal jurisdictions traversed by the Project, as workers for the Project will be primarily drawn from the City of Winnipeg and elsewhere within the RAA. A PDA and LAA were not defined.

At the current stage of Project planning, it is not possible to know the particular areas from where these workers will be drawn, and thus the specific geographic and temporal distribution of such employment benefits. Similarly, the awarding of contracts to provide goods and services to the Project will be based on commercial and technical requirements, while also taking into account factors, for example, such as experience, price, quality, service, safety and delivery. Which companies will bid, meet these criteria, and be successful in winning contracts for the Project likewise cannot be known at this time.

The assessment of the Project's likely effects on employment and economy, presented in the following sections, is focused primarily at the regional level as the RAA will experience involvement in Project activities by virtue of the proximity to the Project components.

Information provided in this assessment is based on that available through federal, provincial, and municipal government databases and information provided by individuals through the PEP.

9.11.1.3 Identified Issues and Concerns

Based on previous experience with similar projects, issues and concerns related to employment and economy include:

- The availability of, and access to, jobs and business opportunities.
- Development of employment and business preferences for local communities.

9.11.2 Project Interactions with Employment and Economy

Table 9.11-1 lists each Project activity and physical work for the Project, and ranks each interaction as 0, 1, or 2 based on the level of interaction each activity or physical work will have with employment and economy.

Table 9.11-1: Project Interactions with Employment and Economy

Project Activities and Physical Works	Potential Environmental Effect	
	Increased Business Opportunities	Effects on Local Employment
Construction:		
Clearing	1	1
Drilling	1	1
Marshalling Yards	1	0
Tower Installation	1	1
Stringing Conductors	1	1
Presence of Materials and	1	0

Table 9.11-1: Project Interactions with Employment and Economy

Project Activities and Physical Works	Potential Environmental Effect	
	Increased Business Opportunities	Effects on Local Employment
Equipment		
Site Reclamation	1	0
Operation and Maintenance:		
Project Presence	1	0
Maintenance of Infrastructure	0	1
Vegetation Management	0	0

KEY:

Project-related Environmental Effects were ranked as follows:

0 = No interaction.

1 = Interaction may occur; however, based on past experience and professional judgment, the resulting environmental effect is well understood and can be managed to acceptable levels through General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). No determination of significance of residual effects or cumulative effects assessment is warranted.

2 = Interaction may occur, and the resulting environmental effect may exceed acceptable levels without implementation of project-specific mitigation. Further assessment is warranted.

9.11.2.1 Justification and Rationale for Interactions Ranked as 1

The Project is not anticipated to have an adverse effect on employment and economy related to business opportunities or local employment, as positive effects are expected. Activities ranked as 1 during construction, including clearing of the ROW, drilling, establishing marshalling yards, tower installation, conductor stringing, presence of materials and equipment, and site reclamation and during operation can be managed and mitigated using standard Manitoba Hydro construction and operation practices. No further detailed assessment is presented.

9.11.2.2 Selection of Environmental Effects and Measurable Parameters

The environmental assessment of employment and economy is focused on the following environmental effects:

- Increased business opportunities
- Effects on local employment

Table 9.11-2 provides the measurable parameters used for the assessment of the selected environmental effect, and the rationale for selection.

Table 9.11-2: Measurable Parameters for Employment and Economy

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Increased business opportunities	Change in business activity levels within the RAA	• Business activity creates wealth and Employment and is a major contributor to the economic health of a region
Effects on local employment	Change in employment levels within the RAA	• Employment is valued for, among other things, the income earning opportunities and associated economic and social benefits that it brings

The selection of measurable parameters in Table 9.11-2 was based on the professional judgment of the Study Team and the results of the PEP.

9.11.3 Residual Environmental Effects Description Criteria

Potential environmental effects of all Project-related activities on employment and economy were ranked as 1 in Table 9.11-1; therefore, no residual environmental effects description criteria or significance thresholds are defined for this VC.

9.11.4 Existing Conditions for Employment and Economy

This section presents a high-level summary of information on existing conditions of employment and economy. For a detailed description of baseline conditions, see Sections 6.4.8.2–6.4.8.5.

9.11.4.1 Baseline Data Sources

Information on baseline economic conditions within the RAA was obtained primarily through desktop research of statistical information. Principal statistical sources of information used included Statistics Canada (Census 2006 and Census 2011), the City of Winnipeg and various other internet sources. Input was also provided from the PEP for the Project.

9.11.4.2 Baseline Overview

The labour force in the rural areas that comprise the RAA (excluding the neighbourhood communities of Fort Garry, St. Boniface and St. Vital) is estimated at nearly 34,710 people (Statistics Canada 2013a-2013j), with a labour force participation rate of 74%, slightly higher than the provincial average of 67.3% (Statistics Canada 2013k). The unemployment rate in the economic region that encompasses the RAA is 4.6 % (Statistics Canada 2013a-2013j), and is lower than the provincial rate of 6.2% (Statistics Canada 2013k).

The regional economy in the RAA is reflective of that of the Province and is largely focused on healthcare and social assistance (12%), retail trade (11%) and manufacturing (8%) (the City of Winnipeg. 2006a–2006b; Statistics Canada. 2013a–2013j). However, Fort Garry, St. Boniface and St. Vital, are populous city neighbourhoods that do not reflect the relatively widespread participation in agriculture (10%) throughout the rural communities of the RAA (Statistics Canada 2013a-2013j).

9.11.5 Project Environmental Effects on Employment and Economy

Potential environmental effects of all Project-related activities on employment and economy were ranked as 0 or 1 in Table 9.11-1; therefore, no residual environmental effects description criteria or significance thresholds are defined for this VC.

9.11.5.1 Assessment of Effects on Employment and Economy

9.11.5.1.1 Construction Effects

Station Modifications and 230-kV Transmission Lines

Through employment and business opportunities, Project construction activities will result in some benefits for communities within the RAA. However, these will be short term in duration as Project construction is expected to commence in June 2017 with an in-service date in July of 2017 for St. Vital to Letellier (V95L) and commencing in July 2017 with an in-service date of February 2018 for La Verendryre to St. Vital (Y36V).

The economic outcomes of the Project will include direct, indirect and induced effects, which are generally defined as follows:

- Direct effects result from the direct hire of persons, and include employment and labour income effects.
- Indirect effects result from the supply of goods and services, and are measured in terms of employment, labour income and business income.
- Induced effects result from the expenditure of money by those employed directly or indirectly on the Project, and can be measured in terms of employment, labour income and business income.

During the Key Person Interview process conducted during the PEP for the Project, City, Municipal and Business respondents indicated that they thought the new transmission line would positively affect businesses. Positive aspects of a more secure power supply related to increased growth and industry expansion, the introduction of new technologies and in the provision of better service.

Actual Project workforce requirements remain to be determined but will be decided through negotiations with the contractors doing the work. Considerations in this process would include clearing and construction methods and sequencing of activities. Previous experience suggests that the workforce will range in number from about 10 personnel during mobilization and demobilization phases to a maximum of 100 personnel per month during peak construction periods.

Communities in the RAA will experience indirect benefits through the purchase of goods and services by the Contractors when work is being done.

Effects on employment and economy from construction are anticipated to be positive, low in magnitude, short-term in duration, sporadic and within the RAA in terms of the geographic extent.

Table 9.11-3: Employment and Economy – Summary of Potential Effects and Mitigation

Potential Effect	Mitigation, Monitoring and Follow-up	Residual Effect
Increased employment opportunities	None required	Increased employment opportunities
Increased business opportunities	None required	Increased business opportunities

9.11.5.1.2 Operation and Maintenance Effects

The Project will be inspected annually. There will be no permanent dedicated workforce. Maintenance activities could consist of limited, short-term contracts for vegetation management to maintain the transmission line rights-of-way. Opportunities for incidental benefits, such as purchased of goods and services, could be periodically occur in local communities.

Effects on employment and the economy from Project operations are anticipated to be positive, low in magnitude, within the RAA in geographic extent, long-term in duration.

9.11.6 Cumulative Environmental Effects on Employment and Economy

The potential beneficial effects for this VC are well understood. A cumulative effects assessment on the effects of this project in combination with other past, current and future projects is not warranted, as the project contribution to total cumulative effects is anticipated to be negligible.

9.11.7 Follow-up and Monitoring

No follow-up or monitoring activities are required at this time.

9.11.8 Summary

The development of the Project is anticipated to have modest beneficial effects on the employment and economy VC, with increases and improvements occurring in measures that reflect the scale of the Project.

9.12 PROPERTY AND RESIDENTIAL DEVELOPMENT

This section provides an overview and assessment of Project interactions with property and present and future residential development in the vicinity of the Project. Property and residential development was selected as a VC in recognition of its importance to individuals and communities within the RAA. Potential effects to property and residential development are primarily related to changes to property, including property values and nuisance effects (noise, vibration, dust and aesthetics) and proximity to residences and potential areas of residential development due to construction and operation of the Project. In the following section, the environmental effects of Project activities on property and residential development resulting from construction and operation and maintenance are assessed.

9.12.1 Scope of Assessment for Property and Residential Development

9.12.1.1 Regulatory Setting

The scope of the assessment for property and residential development is based on various municipal by-laws, Provincial Land Use Policies (see Section 6.4.6) and s.11 of the *Manitoba Environment Act*. Specifically, the assessment was prepared to meet the filing requirements and guidance for socio-economic effects.

9.12.1.2 Boundaries

The temporal boundaries for the assessment of the potential environmental effects of the Project on property and residential development include the periods of construction and operation and maintenance of the Project; see Section 3.7 for the Project construction schedule. Operation and maintenance of the Project will begin following construction and will be carried out until project decommissioning.

The spatial boundaries for the environmental effects assessment of property and residential development are assessed within the PDA and LAA. These comprise the areas within which direct and indirect environmental effects for property and residential development during Project construction and operation and maintenance are anticipated to occur.

The PDA is defined as the area within which all construction activities associated with the Project will take place. For this Project, the PDA constitutes a 64-m-wide ROW between St. Vital Station to the City of Winnipeg limits, a 40-m-wide ROW extending from the City of Winnipeg to Letellier Station, and a 34 m wide ROW for the Southern Loop corridor emanating from La Verendrye Station.

The LAA is defined as the PDA area and an additional 500 m buffer from the ROW on each side (Map 9-6). The LAA is the area where indirect or secondary environmental effects of construction and operation and maintenance are likely to be most pronounced or discernible.

The RAA (see Section 9.10.1.2) is defined as the municipal jurisdictions traversed by the Project.

The technical boundaries included limitations in scientific information, data analyses, and interpretation. Information provided in this assessment is based on that available through federal, provincial, and municipal government databases and information gathered by individuals through the PEP.

9.12.1.3 Identified Issues and Concerns

Concerns regarding the environmental effects of the Project on property and residential development were identified during the PEP. Issues and questions associated with the potential effects of the Project on property and residential development are primarily associated with routing and how the eventual presence of the transmission line may overlap physically with property within the RAA. Comments included the following issues and concerns:

- Presence of the project on property values.
- Aesthetics of towers close to rural residential development (see Section 9.15).
- Proximity of the Project to future residential development.
- The proximity of the Project to farmstead locations.

9.12.2 Project Interactions with Property and Residential Development

Table 9.12-1 lists each Project activity and physical work for the Project, and ranks each interaction as 0, 1, or 2 based on the level of interaction each activity or physical work will have with property and residential development, including potential future development.

Table 9.12-1: Project Interactions with Property and Residential Development

Project Activities and Physical Works	Potential Environmental Effect	
	Change to Property	Nuisance
Construction:		
Clearing	1	2
Drilling	1	2
Marshalling Yards	0	1
Tower Installation	1	2
Stringing Conductors	1	2
Presence of Materials and Equipment	1	1
Site Reclamation	1	1
Operation and Maintenance:		
Project Presence	2	2
Maintenance of Infrastructure	0	1
Vegetation Management	0	0

KEY:

Project-related Environmental Effects were ranked as follows:

0 = No interaction.

1 = Interaction may occur; however, based on past experience and professional judgment, the resulting environmental effect is well understood and can be managed to acceptable levels through General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). No determination of significance of residual effects or cumulative effects assessment is warranted.

2 = Interaction may occur, and the resulting environmental effect may exceed acceptable levels without implementation of project-specific mitigation. Further assessment is warranted.

9.12.2.1 Justification and Rationale for Interactions Ranked as 1

The effect on or change to property through the taking of an easement for the 230 kV transmission lines will be compensated under Manitoba Hydro's existing compensation policy. All construction activities ranked as 1, including establishment of marshalling yards and site reclamation can be managed and mitigated using standard mitigation measures outlined in Chapter 10.

9.12.2.2 Selection of Environmental Effects and Measurable Parameters

The environmental assessment of property and residential development is primarily focused on changes to property within the RAA and potential for nuisance. In this section, the environmental effects of Project activities on property and residential development resulting from all phases of the Project will be assessed.

Table 9.12-2 provides the measurable parameters used for the assessment of the selected environmental effect, and the rationale for selection.

Table 9.12-2: Measurable Parameters for Property and Residential Development

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Nuisance	Noise and dust, vibration, aesthetics	• Noise and dust, vibration, and aesthetics associated with construction the transmission system could have adverse effects on general well-being.
Change to Property	Increase/decrease in property values Proximity to residences and future residential areas	• Comparison of projected levels with existing levels allows Project effects to be determined. • Proximity to residences and future residential development.

The selection of measurable parameters in Table 9.12-2 was based on the professional judgment of the Study Team and the results of the PEP.

9.12.3 Residual Environmental Effects Description Criteria

Parameters listed in Table 9.12-3 below are used to characterize and evaluate residual environmental effects of the Project on property and residential development.

Table 9.12-3: Characterization of Residual Environmental Effects for Property and Residential Development

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The ultimate long-term trend of the environmental effect	**Positive** – a beneficial effect on property and residences
		Adverse – a negative effect on property and residences
		Neutral – no net change on property and residences
Magnitude	The amount of change in a measurable parameter or variable relative to baseline case	**Negligible** – no measurable change to property and residences
		Low – a minor measureable change to property and residences

Table 9.12-3: Characterization of Residual Environmental Effects for Property and Residential Development

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		Moderate – a measurable change but less than high to property and residences
		High – a substantial measurable change to property and residences
Geographical Extent	The geographic area in which an environmental, economic, social, heritage, or health effect of a defined magnitude occurs	**PDA** – effects are restricted to the PDA
		LAA – effects extend into the LAA
		RAA – effects extend into the RAA
Duration	The period of time required until the VC returns to its baseline condition, or the effect can no longer be measured or otherwise perceived	**Short-term** – effects restricted to the construction phase
		Medium-term – effects extend through the operation phase
		Long-term – effects extend beyond decommissioning
		Permanent – measurable parameter unlikely to recover to baseline
Frequency	The number of times during the Project or specific Project phase that an environmental effect may occur	**Occasionally** – once per month or less
		Sporadic – once per week
		Regular – more than once per week intervals
		Continuous – regularly throughout the life cycle of the Project
Socio-economic Context	The resilience or ability of an environment to accommodate change.	**Low** – environment less able to accommodate change
		Moderate – well developed and functioning systems in place that are able to accommodate some change
		High – well developed and functioning systems able to accommodate changes

Table 9.12-3: Characterization of Residual Environmental Effects for Property and Residential Development

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Likelihood of Significant Effect	The likelihood that a significant effect will occur if the assessment has made a conclusion of significance for a VC.	**Low** – a low probability of the significant effect occurring
		Medium – a medium probability of the significant effect occurring
		High – a high probability of the significant effect occurring

9.12.3.1 Significance Thresholds for Residual Environmental Effects

A significant residual adverse environmental effect on property and residential development is one where Project activities will result in sustained property and nuisance effects for an extended period of time (i.e., beyond the construction phase) after the application of mitigation measures.

9.12.4 Existing Conditions for Property and Residential Development

This section presents a high-level summary of information on existing conditions of property and residential development. For a detailed description of baseline conditions, see Section 6.4.5.

9.12.4.1 Baseline Data Sources

Baseline data were predominantly collected from a variety of provincial and local government sources. Table 9.12-4 summarizes the objectives, methods, and data sources.

Table 9.12-4: Baseline Research Methods for Property and Residential Development

Baseline Component	Objective and Outcome	Data and Approach
Property Ownership	Describe property ownership and rural residential development within the RAA.	Review local, regional, and planning documents, and property ownership mapping from agencies and the various municipalities within the RAA.

9.12.4.2 Baseline Overview

9.12.4.2.1 Property and Rural Residential Development

The final preferred route primarily crosses through agricultural land that for the most part is privately owned. For the Southern Loop corridor from La Verendrye Station through the City of Winnipeg along the Red River Floodway to the RM of Ritchot, the final preferred route is approximately 37 km in length. South from St. Vital Station through the city limits to Letellier Station in the RM of Montcalm, the final preferred route is approximately 119 km in length.

For the Southern Loop corridor between La Verendrye Station and where the final preferred route joins with route south of St. Vital Station in the RM of Ritchot, there are two buildings within the ROW (west of Pembina Highway in the city of Winnipeg near the Floodway inlet). No residences are located within 75 m from the ROW edge. Another 28 residences are located 75 to 250 m from the ROW edge (Google Earth Imagery, dated 2013).

For the portion of the route from St. Vital Station south to Letellier, including through Sage Creek in the City of Winnipeg, no residences are located within the ROW for the final preferred route. A total of 94 residences are located within 75 m (approximately) from the route ROW edge. Another 207 residences fall within 75 to 250 m from the edge of the ROW.

The route for the proposed transmission line generally avoids rural communities and areas of rural residential development, including areas designated for future urban and rural residential development, and was selected to avoid displacing or passing within close proximity to dwellings (i.e., within 75 m) to the maximum extent possible. Two ancillary buildings are crossed by the ROW along the Southern Loop corridor.

The final preferred route is in close proximity to dense residential development in a few areas. In the City of Winnipeg, the St. Vital South transmission corridor crosses through the new Sage Creek development on an existing ROW. For this portion of the ROW through Sage Creek, the new transmission line will be located on one larger double-circuit steel tower on the east side within the existing ROW for a distance of approximately 1.6 km (i.e., 49 m in from the ROW edge) paralleling an existing transmission line through this section. Manitoba Hydro is limited to the distance it can use the larger double-circuit steel tower (1.6 km) due to an applicable NERC standard for transmission line design. Outside the existing developed portion of Sage Creek to the north and south, there will be two 230 kV transmission lines on separate steel lattice towers situated on the east side of the existing ROW (Figure 3.2-3). The community of Sage Creek is still under development with a full build out of residences not yet at a completed stage. As noted previously, there is already a Manitoba Hydro owned ROW that pre-dates the development and the addition of any new residences as part of future development in Sage Creek.

Other residential development in the RAA includes Oak Bluff West, adjacent on the south side of Oak Bluff southwest of the city. Manitoba Hydro’s existing Southern Loop corridor ROW is located approximately 1.6 km to the west of this area that is currently under development. In the

RM of Ritchot, a Rural Centre Area is located approximately 290 m to the east of the final preferred route at Ile des Chenes (west of PTH 59).

Along road allowances, the tubular steel structures will be situated adjacent to the road allowance edge on a 23.75 m easement. Where the line is routed along the ¼ section line, the structures will be centered along the quarter section line. A review of the most recent Property Ownership Mapping for the Project RAA was conducted. For the Southern Loop from La Verendrye Station through the RM of Macdonald to the city of Winnipeg boundary, the new line will be located on an existing ROW across 24 properties that is a mixture of wholly owned or partially owned parcels held by Manitoba Hydro. Through the City of Winnipeg to the RM of Ritchot boundary, the new line will utilize existing ROW consisting of portions either owned by Manitoba Hydro, or under easement, and a portion under a Floodway Agreement between Manitoba Hydro and Her Majesty the Queen Manitoba (HMQ-MB) along the Floodway. South of St. Vital Station to the city limits, Manitoba Hydro owns the existing ROW. The crossing of the Floodway through the RM of Ritchot is under a Floodway Agreement with HMQ-MB. South of the city of Winnipeg to Letellier Station, the new alignment will utilize ¼ section lines or be adjacent to road allowances and would affect a total of approximately 185 private properties (some of which are in common ownership). Potential effects from line placement (i.e., taking an easement) include crossing through or splitting properties. Of the total number of private properties affected, the easement would pass along on the same side as the road allowance of 101 properties and split another approximately 30 properties.

In addition to private properties, the easement for the 230-kV line would affect two properties that are Crown or Crown land (at the Floodway) and four properties that are municipally-owned. The final preferred route also passes alongside one parcel of Crown land south of Letellier Station. A review of Crown land encumbrance data obtained from the Provincial Crown Lands and Property Agency revealed Crown land encumbrances affected by the final preferred route include: two cropping leases, one forage lease and a miscellaneous lease for a Centra Gas pipeline in 31-9-4E along the Floodway in the RM of Ritchot; and an easement for an oil pipeline in 20-9-4E also in the RM of Ritchot.

The final preferred route will also involve paralleling, crossing perpendicularly or diagonally river lot parcels in five areas, including: through the city of Winnipeg, in the St. Norbert area (crossing diagonally for approximately 5 km and paralleling for approximately 2 km) in the RM of Ritchot east of PTH 59 and Grande Pointe (crossing perpendicularly for approximately 200 m); in the RM of De Salaberry, south of PR 205 and Joubert Creek for approximately 400 m; in the RM of Franklin east of the Red River for approximately 1.6 km; and in the RM of Montcalm west of the Red River for approximately 3.2 km. Other property holdings on land affected by the final preferred route include various Hutterite Colony holdings involving 14 separate parcels of land in the RMs of Hanover (Suncrest Holding Co. Ltd.), De Salaberry (Glenway Holding Co. Ltd.) and Franklin (Ridgeville Holding Co. Ltd.).

Land Use and Development Controls

The total length of the line crossing over agricultural Crown land is approximately 9.3 km; whereas the length of line crossing over private lands is approximately 146.5 km.

The lands traversed by the final preferred route outside of urban centres or areas of residential development are primarily designated either as “Agriculture” or “General Agricultural Area” under applicable municipal development plans, particularly outside the city of Winnipeg. In the vicinity of Oak Bluff, lands outside the built up area are designated as “UC – Urban Centre Policy Area” and “UCH – Urban Centre Hold Policy Area”. Zoning regulations are generally consistent with the existing land uses. At two locations in the RMs of Macdonald and Ritchot, the final preferred route crosses through areas designated as an “EV – Environmental Policy Area” established for sewage lagoons. The existing lagoons within these areas are avoided by the route.

Within the City of Winnipeg, the majority of lands south of the Perimeter Highway are designated as “Rural Agricultural”. The exception is the Sage Creek area south of St. Vital Station to the Perimeter Highway. The residential development area is designated as a “Recent Community” under the city’s development plan. Under the city’s zoning by-law, St. Vital Station and the existing ROW are zoned as “PR2 – Parks and Recreation 2 (Community)” and “RR5 – Rural Residential 5” respectively. South of the Perimeter Highway within the city, the existing ROW is zoned “A – Agricultural.”

In rural and agricultural areas, development plans note that utilities are a land use, subject to applicable municipal zoning by-laws and should be developed in a manner that minimizes potential incompatibilities with neighboring land uses.

9.12.5 Project Environmental Effects on Property and Residential Development

Only the interactions ranked as 2 in Table 9.12-1 are considered further with respect to potential residual and cumulative effects and determination of significance in the assessment of Project-related environmental effects.

PEP Input on Property Impacts and Residential Development

During the PEP for the Project, including through Aboriginal engagement, comments have been received from the public on landowner compensation, avoidance of rural residential developments (as well as commercial and industrial developments), noise and dust nuisance effects, perceived health effects due to EMF, and vegetation management and herbicide use. For landowner compensation, Manitoba Hydro provides a one-time compensation payment for transmission line easements (75 percent of market value for 230 kV lines) and compensates landowners for any damages which may occur through the construction and operation of the line. Locations of rural residential, commercial and industrial development areas are avoided where possible in the route selection. Manitoba Hydro will minimize noise and dust nuisance effects during the construction and operation phases of the Project.

Manitoba Hydro will not use herbicides to clear the line during construction. All herbicide use during operations is reviewed and regulated by the Pesticide Section of the Environmental Assessment and Licencing Branch of Manitoba Conservation and Water Stewardship. Herbicides are applied by licensed applicators based on product labeling and current practice and knowledge for application. Manitoba Hydro will follow conditions included in a Pesticide Use Permit taken out for the Project and typically applies less than the recommended label rate.

Comment was also received to locate transmission lines within existing Hydro transmission line corridors. Where possible the lines are located in existing, Manitoba Hydro owned or eased ROW. For example, a portion of the line passing through Sage Creek is in an existing Manitoba Hydro owned corridor as is the Southern Loop corridor that extends from La Verendrye to St. Vital Station.

Community of Sage Creek and Qualico

The community of Sage Creek and the Sage Creek Residents Association have been in discussions with Manitoba Hydro regarding the Manitoba Hydro owned ROW that currently houses an existing transmission line. Many residents requested that an alternative be reviewed which would avoid the communities' green space located along the ROW. Underground options were also requested by community members as they believed it would minimize impact to property values, EMF exposure and aesthetics.

Manitoba Hydro understands the concerns of the community and has proposed a double circuit structure for one mile through the existing development of Sage Creek. Based on NERC standards, only one mile of double circuit is possible. This alteration to design will provide one row of transmission line towers as opposed to two for one mile (as outlined in the Project Description – Figure 3.2-3).

9.12.5.1 Assessment of Nuisance

9.12.5.1.1 Construction Effects

Station Modifications

Station modifications will be required to terminate the Project at St. Vital Station and La Verendrye Station. Upgrades at both stations include additional equipment to terminate the new lines as well as revisions to existing protection and communication systems to accommodate the new line. All station modifications and equipment additions will be conducted on existing Manitoba Hydro property and within the fenced area for each station. No effects are expected on adjacent properties in the area beyond the existing station site boundaries as a result of the Project.

230-kV Transmission Lines

Construction has the potential to cause nuisance effects on properties and rural residences within the LAA. Such effects include noise disturbance, vibration, dust, damage to property, aesthetics (see Section 9.15.5) and Project-related interference of roads and community infrastructure (see Section 9.10).

Potential noise, vibration and dust sensitive receptors include daycares, schools, hospitals, places of worship and nursing homes. The transmission corridor is routed in such a way so as to avoid such receptors. No existing schools, daycares, hospitals, nursing homes or churches are located within 250 m from the edge of the ROW. Noise sources within the LAA are anticipated to be typical of construction activities for transmission lines in rural areas, and will include some temporary noise disturbances (e.g., movement of equipment, splicing of conductors). For splicing of conductors, Manitoba Hydro utilizes implosives to join the conductors together. When used, the sound produced would constitute a short very loud bang. Manitoba Hydro will notify landowners in the vicinity of where implosives are being used regarding the schedule for this activity. Adverse noise and vibration effects due to construction related activities are anticipated to be short-term and minimal.

There are 94 residences within 75 m from the ROW edge, including the portion of the ROW within the City of Winnipeg south of St. Vital Station through Sage Creek. Potential adverse effects include the possibility of disturbance and annoyance to community residents as a result of heavy equipment being operated nearby. The Province of Manitoba’s Guidelines for Sound Pollution in residential areas indicates a maximum desirable sound level objective of 55 dBA (day) and 45 dBA (night). The higher sound levels generated during construction will be transient as equipment is moved along the ROW; therefore, nearby residents will not be affected for prolonged periods. Noise levels during the night will also remain unchanged from the existing conditions, as construction activities related to the assembly and installation of towers will only occur during the day.

9.12.5.1.2 Mitigation

During construction, Manitoba Hydro will provide information and updates on ongoing and planned construction activities. On a case by case basis, a voluntary purchase can be considered for residences where the proximity of the transmission line on new ROW is within 75 m (i.e., to the nearest part of the line such as the conductor/crossarm).

Project scheduling and logistics planning can minimize the effects of construction. Measures to mitigate or minimize the effects of project-related effects include the following:

- Vehicle, machinery and pedestrian traffic will be restricted to project-related access routes and cleared project sites.
- Existing all-weather roads and access will be utilized wherever possible.

- Mud, dust and vehicle emissions will be managed in a manner that will ensure safe, continuous public activities in the vicinity of construction sites.
- Equipment will be kept in good working order condition at all times.
- Water and approved dust suppression products will be used to control dust when necessary.
- Construction methods and timing will be designed to minimize traffic disruption. Equipment and materials will be operated and stored in secure designated areas to ensure public safety.
- Manitoba Hydro will provide notification to adjacent landowners and communities and provide appropriate signage regarding when and where implosives are to be used.
- The use of implosives for splicing conductors in any one area will be restricted to normal working hours.
- Municipal and local protocols and bylaws will be observed. Appropriate methods will be applied to comply with regulatory standards during construction of the transmission line, including temporary construction access. In built up areas and other areas where noise and vibration may create disturbance, work will be limited to daylight hours in accordance with local noise bylaws.
- Crown land encumbrance lease holders will be notified in advance of the schedule for construction, including requirements for temporary construction access.
- ROW boundaries and sensitive areas will be identified and clearly marked prior to construction.
- Construction personnel will ensure that activities and equipment do not impact upon neighbouring properties, structures or operation. In the unlikely event that physical damages are incurred by a landowner, damages are subject to compensation through Manitoba Hydro’s existing compensation policies.

9.12.5.1.3 Characterization of Residual Nuisance During Construction

A summary of the environmental effects assessment and prediction of residual environmental effects resulting from interactions with property and residential development that were ranked as 2 in Table 9.12-1 is provided in Table 9.12-5 below.

The likely residual effects of Project construction on nuisance effects (i.e., dust, vibration) are as follows:

- **Direction:**
  - Project nuisance effects will be **adverse** because there will be increased disturbance of, and annoyance to, residents as a result of construction activity.

- **Magnitude:**
  - Project nuisance effects will be of **low** magnitude, and then only during working hours; any increase in sound levels will be temporary during construction.
- **Geographic Extent:**
  - **Local** in geographic extent, limited to residences along or in close proximity to the ROW.
- **Frequency/Duration:**
  - Project nuisance effects will be of **short-term** duration throughout construction.
  - Of **continuous** frequency as certain construction disruptions (e.g., clearing and tower installation) will extend throughout the construction phase and beyond.
- **Socio-economic Context:**
  - Project effects will occur in an area of **moderate** resilience.

There is a high degree of certainty in these effects predictions given the general nature of the Project, the effects management approaches and measures proposed, and experience with similar projects.

9.12.5.1.4 Operations and Maintenance Effects

Station Modifications

As modifications to both the St. Vital and La Verendrye stations will occur within existing fenced station sites, there will be no expected Project-related effects. The stations will continue to operate as they currently do.

230-kV Transmission Lines

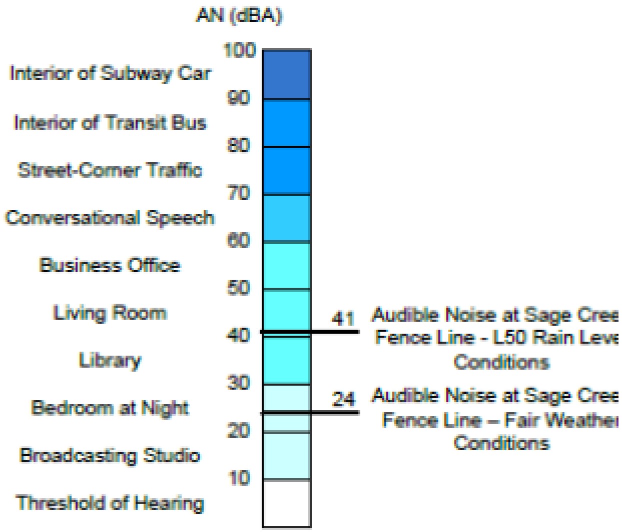
Project operations and maintenance has the potential to affect residents and property owners through noise generation and aesthetic changes (see Section 9.15.5 Aesthetics). A transmission line emits audible noise when electrical energy within the conductor interacts with the air surrounding the conductor surface. These reactions, or corona, depend on ambient conditions such as temperature, humidity, and wind speed and direction.

Project maintenance activities such as vegetation management and route patrols have the potential to disturb and inconvenience residents within the LAA.

Manitoba Hydro has undertaken modeling to understand the projected levels of audible noise expected at the edge of the Sage Creek ROW (Figure 9.12-1). In fair weather conditions, the audible noise associated with the transmission line at the edge of the ROW is expected to be 24 dBA, which is comparable to a bedroom at night, and quieter than a library. This is below the applicable standard of 50 dBA (Canadian Standard CAN3-C108.3.1-M84). On rainy days, audible noise at the edge of the ROW is expected to be 41 dBA, which is comparable to the noise level in a living room. Manitoba Hydro personnel have been in discussions with the Sage Creek Residents Association to understand and address their concerns.

9.12.5.1.5 Mitigation

Project maintenance will be temporary and intermittent and conducted during daylight hours. Equipment will be kept in good working order and Project staff will ensure that activities will not impact neighboring properties.



Reference: EPRI AC Transmission Line Reference Book, 3rd Edition, 2005.

*Notes:

- dBA: A-weighted decibel scale.
- L50: Level of rainfall exceeded for more than 50% of the time.
- Fair Weather: Dry Insulators and conductors; no snow, rain, or fog for 10 km distance.
- These results satisfy Canadian Standard CAN3-C108.3.1-M84: Below 50 dBA at 1MHz,15m from outer conductor in fair-weather conditions (condition is met for a more severe wet-weather case).

Figure 9.12-1: Sage Creek 230 KV Transmission Line Addition – Results of Audible Noise (AN) Level Analysis and Comparison with Daily Examples

9.12.5.1.6 Characterization of Residual Nuisance During Operations

A summary of the environmental effects assessment and prediction of residual environmental effects resulting from interactions with property and residential development that were ranked as 2 in Table 9.12-1 is provided in Table 9.12-5 below.

The likely residual effects of Project construction on nuisance effects are as follows:

- **Direction:**
  - Project nuisance effects (i.e., dust, vibration) will be **adverse**.
- **Magnitude:**
  - Project nuisance effects will be of **low** magnitude.
- **Geographic Extent:**
  - **Local** in geographic extent, limited to residences along or in close proximity to the ROW.
- **Frequency/Duration:**
  - Project nuisance effects will be of **medium-term** duration throughout construction.
  - Of **continuous** frequency (e.g., noise).
- **Socio-economic Context:**
  - Project effects will occur in an area of **moderate** resilience.

9.12.5.2 Assessment of Change to Property

9.12.5.2.1 Operation and Maintenance Effects

Station Modifications

As modifications to both the St. Vital and La Verendrye stations will occur within existing fenced station sites, there will be no expected Project-related effects on property. The stations will continue to operate as they currently do.

230-kV Transmission Line

The presence of a transmission line can affect property and residential development. The Project route involving new ROW generally avoids residences and residential development, including areas designated for future urban and rural residential development. For the most part, the final preferred route was selected to avoid displacing or passing within close proximity to rural residences (i.e., within 75 m) and areas of rural residential development to the maximum extent possible. This was not possible to do through the Sage Creek area as an existing Manitoba Hydro owned ROW used for the Project pre-dated the new residential development, where there are now residences within 75 m from the ROW edge in the LAA.

Research on property values associated with transmission line projects has shown that small effects on values sometimes occur immediately after construction but diminish over time with no long-term effects (Cowger *et. al.* 1996; Edson Electric Institute 1992; Jackson and Pitts 2010; Kung and Seagle 1992). Further review of the literature on the effects on property value from transmission line development drawn from studies undertaken between 1990 and 2010 suggest that generally, the effects on property values were minimal or none at all. With respect to proximity and visibility, there was no statistical effect on property values in residential neighbourhoods. It was further noted that any value effects vary with the location and size of the property (i.e., urban vs. rural, large vs. small), and were greater in the short-term but diminished with distance and time, and varied to the extent that the transmission line is visually seen (Chalmers and Voorvart 2009; Colwell 1990; Cowger et al. 1996; Bottemiller et al. 2000; Grover et al. 2008; Jackson and Pitts 2010).

Manitoba Hydro's position is that the presence of transmission lines does not significantly affect residential property values. Manitoba Hydro has undertaken its own research on property values. Since 2000, a yearly Property Value Monitoring Program has been conducted in the Birds Hill and Lister Rapids areas in the Rural Municipalities of East and West. St. Paul. The monitoring program was initiated in response to property owner concerns regarding the construction of the Dorsey-St. Vital 230 kV Transmission Line within an existing ROW. Real estate transactions for developed single-family residential properties within the monitoring area have been tracked over the period January 1, 1992 and June 1, 2011 (the latest report end-date). The monitoring area was delineated according to adjacent land (properties backing onto the ROW), nearby land (located between the adjacent land and the next property line), or other land (all property lying north of the nearby lands). The 2011 monitoring report noted that housing prices have continued to fluctuate within normal ranges, though the ranges increased considerably due to the 2006/2008 housing price boom. Since May 1998, the overall average price increased by approximately 49% in East St. Paul and by 52% in Lister Rapids. The rates of sale transactions for adjacent, nearby and other locations of property continue to be distributed normally throughout (Manitoba Hydro, Property Department 2011).

9.12.5.2.2 Mitigation

Operation and maintenance has less potential for general disturbance to property and residential development adjacent to the ROW. Measures to minimize or mitigate Project-related effects include the following:

- Municipal and local protocols and by-laws will be respected and appropriate methods will be applied to comply with regulatory standards during operation of the transmission line.
- Affected private landowners and Crown land encumbrance lease holders will be notified in advance of the schedule for operation and maintenance.
- Operations personnel will ensure that operation and maintenance activities and use of equipment do not impact or damage neighbouring properties.

In the unlikely event that physical damages are incurred by affected property owners or adjacent landowners to the ROW during operations of the transmission line, damages are subject to compensation through Manitoba Hydro's existing compensation policies.

9.12.5.2.3 Characterization of Residual Change to Property

The likely residual effects of Project operations and maintenance on property and residential development are as follows:

- **Direction:**
    - **Adverse**, as the presence of the Project has the potential to cause a negative effect on property.
- **Magnitude:**
    - Of **low** magnitude, as the research and relevant experience suggests that property is not particularly affected by the presence of the transmission line.
- **Geographic Extent:**
    - **Local** in geographic extent, as most if not all Project interactions with property and residential development will occur within the LAA, and particularly, at the Project sites and adjacent areas.
- **Duration/Frequency:**
    - Of **permanent** duration as the presence of the ROW and towers will continue throughout the life of the Project.
    - Of **continuous** frequency as property may be affected throughout the life of the Project.

There is a high degree of confidence that the level of effects of Project operations and maintenance on property and residential development will be as predicted because Manitoba Hydro has considerable experience with the construction, and operations and maintenance of transmission lines. There is a substantial amount of industry knowledge and academic studies to support the effects predictions.

9.12.5.3 Summary of Project Residual Environmental Effects on Property and Residential Development

The combined residual environmental effects on property and residential development are predicted to be adverse and not significant (Table 9.12-5).

Table 9.12-5: Summary of Project Residual Environmental Effects on Property and Residential Development

Potential Residual Environmental Effects for Project Activities and Physical Works	Proposed Mitigation/Compensation Measures	Residual Environmental Effects Characteristics							Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Socio-economic Context	Significance	Likelihood of Significant Effects	
Nuisance Effects									
Construction – Clearing and construction	• Maintaining equipment in good working condition • Restricting working hours • Minimize traffic disruption	A	L	L	ST/ C	M	N	N/A	None
Operation – Project Presence	• Maintaining equipment in good working condition • Restricting working hours	A	L	L	MT/ C	M	N	N/A	None
Change to Property									
Operation and Maintenance – Project Presence	• Municipal and local by-laws and regulatory standards will be complied with • Communication with affected communities and individuals as to schedule of activities • Activities and equipment will be operated so not to damage property	A	L	L	P/C	M	N	N/A	None

KEY (Refer to Table 9.12-3 for definitions on the terms referenced below):

Direction: P: positive; A: adverse; N: Neutral

Table 9.12-5: Summary of Project Residual Environmental Effects on Property and Residential Development

Potential Residual Environmental Effects for Project Activities and Physical Works	Proposed Mitigation/Compensation Measures	Residual Environmental Effects Characteristics							Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Socio-economic Context	Significance	Likelihood of Significant Effects	

Magnitude: N: Negligible; L: Low; M: Moderate; H: High

Geographic Extent: L: Local- within the PDA/LAA; R: Regional - within the RAA

Duration: ST: Short-term; MT: Medium-term; LT: Long-term; P: Permanent – will not change back to original condition

Frequency: O: Occasionally, once per month or less; S: Sporadic, once per week; R: Regular, more than once per week intervals; C: Continuous, regularly throughout the life cycle of the Project.

Socioeconomic Context: L: Low, M: Moderate, H, High

Significance: S: Significant; N: Not Significant.

Likelihood of Significant Effects: based on literature review and professional judgment. N/A: Not Applicable; L: Low; M: Medium: H: High

9.12.5.4 Determination of Significance of Residual Environmental Effects

Significant residual adverse socioeconomic effects on property and residential development would result if the Project caused an overall, detectable and sustained change to property and/or nuisance levels for affected individuals or communities.

As described above, the Project is not anticipated to cause such measurable change; therefore, no significant residual effects of the Project on property and residential development are anticipated.

9.12.6 Cumulative Environmental Effects on Property and Residential Development

This section consists of an evaluation of the effects of the Project on Property and Residential Development in combination with the effects of other projects or activities that will likely overlap spatially and temporally with those of the Project. These effects are considered in relation to the past, current and reasonably foreseeable future projects and actions listed in the table below, to determine the potential for the effects from the Project to act cumulatively in a manner that could cause a change in the VC that will alter its status or integrity beyond an acceptable level, relative to the established threshold.

The potential for interaction between the effects of the Project on property and residential development and the effects of other identified past, current and future projects are presented in Table 9.12-6. Projects will have an interaction ranked as 0 if Project environmental effects do not overlap spatially and temporally with those of other projects and activities, and, therefore, do not have the potential to act cumulatively with those of other projects and activities. Interactions ranked as 1 are Project environmental effects that act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). Interactions ranked as 2 are those interactions where Project environmental effects act cumulatively with those of other projects and activities, and may exceed acceptable levels without the implementation of project-specific or regional mitigation.

Table 9.12-6: Potential Cumulative Environmental Effects on Property and Residential Development

Other Projects and Activities with Potential for Cumulative Environmental Effects		Potential Cumulative Environmental Effect	
		Nuisance effects	**Change to property**
Infrastructure Projects	PTH 59 Twinning	1	1
	PTH 52 Twinning	1	1
	PTH 75 Rehabilitation	1	1
Residential Projects	Sage Creek Residential Development	1	1
Energy Projects	Manitoba-Minnesota Transmission Project	1	1
	Bipole III Transmission Project	1	1
	St. Joseph Windfarm Project	1	1

KEY:

Cumulative environmental effects were ranked as follows:

0 = Project environmental effects do not act cumulatively with those of other projects and activities.

1 = Project environmental effects act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of beneficial management or codified practices.

2 = Project environmental effects act cumulatively with those of other projects and activities and the resulting cumulative effects may exceed acceptable levels without implementation of project-specific or regional mitigation.

9.12.6.1 Assessment of Cumulative Effects on Property and Residential Development

9.12.6.1.1 Infrastructure Projects

Future highway expansion, the twinning of PTH 59 and PTH 52 is planned for construction in the future and will traverse the Project route. PTH 59 runs south of Winnipeg and intersects with the proposed Project route 3 times (Map 9-6). Rehabilitation of PTH 75 to address perennial flooding concerns with the Red River is also planned. PTH 75 is intersected once by the Project. There is potential for a cumulative effect as highway expansion has the capacity to interact with the Project through changes to property and nuisance within the PDA and LAA. However, the literature supports the opinion (Edson Electric Institute 1992; Jackson and Pitts 2010) that such property effects would be short-term. In a regional context, the highway expansion may also make the area a more desirable place to live due to improved access and ease of travel.

9.12.6.1.2 Residential Projects

Specific plans for residential development in the Project area include additional housing in the Sage Creek area within the City of Winnipeg. This development will occur on both sides of the existing Manitoba Hydro owned ROW south of St. Vital Station. This development would be expected to follow applicable municipal and/or provincial guidelines which would serve to limit interactions with and mitigate Project-related effects. Construction activities are expected to be fully mitigated and would have negligible additive interaction. Effective design mitigation applied to the Project would further serve to mitigate the potential for cumulative effects to occur.

9.12.6.1.3 Energy Projects

Transmission

Existing transmission lines within the RAA as part of the baseline include the 230-kV La Verendrye to Letellier (Y51L) and Stanley to Letellier (S60L) lines. The St. Vital to Letellier (V95L) transmission line of the Project would also terminate at Letellier Station with these existing lines in the RM of Montcalm.

The construction and operation of the proposed Manitoba to Minnesota Transmission Project (MMTP), the addition of one 500-kV AC line within Manitoba Hydro's identified Southern Loop corridor west and south of the city of Winnipeg, and the approved Bipole III (BPIII) Transmission Project may overlap temporally and spatially with the phases and activities of this Project. The BPIII route crosses the Project route once, south of Niverville, Manitoba. Preliminary preferred route options have been identified for the proposed MMTP which have been the subject of its own PEP; the identified route options would use the same Southern Loop corridor as the Project and would cross over the St. Vital to Letellier (V95L) route in the RM of Ritchot.

The BPIII transmission route and the proposed MMTP preliminary preferred route options near the Project have the potential to act cumulatively to cause change to property and nuisance in the LAA. Clearing and construction for Bipole III in the southern portion of the route is to occur from 2016 to 2017. The Project timeline for MMTP proposes construction over the period of the final third of 2016 (September to December) through to 2020. The project schedule for the St. Vital Transmission Complex for transmission line construction is July 2016 to December 2017. The potential for overlap between the Projects (i.e., coincidental movement of material and people) could occur in the final half of 2016 through to the end of 2017. Proper planning and scheduling of activities will be required, as well as the application of mitigation measures for these projects as they proceed. With respect to property value, a review of the relevant literature suggests small to no effects on sales price due to the presence of transmission lines (Cowger et al. 1996; Jackson and Pitts 2010; Kung and Seagle 1992). Therefore, the change to property and nuisance for current users resulting from the effects of the Project in combination with these other transmission projects and activities is not expected to result in a detectable additive interaction.

Wind Energy

The St. Joseph Windfarm is located near St. Joseph, Manitoba, west of PTH 75, south of PTH 14 and north of PR 421. This windfarm consists of 60 2.3-MW turbines and will overlap spatially and temporarlly with the Project RAA if the Project is constructed. Its presence may interact with the Project to produce an adverse cumulative effect on property within the LAA of both developments. However, as the Windfarm is not a linear project, it is located in one designated site concentrated in one area, and as such it is not anticipated that it would result in an overall, detectable and sustained change to property and nuisance outside of this particular site.

9.12.6.2 Summary of Project Cumulative Environmental Effects on Property and Residential Development

Projects and activities with residual adverse effects that have the potential to overlap with residual adverse effects of the Project on infrastructure and services include: the Bipole III Project, the Manitoba Minnesota Transmission Project, and the Sage Creek residential development. There is some potential for cumulative effects from these developments. Development of the Bipole III Project and the Manitoba Minnesota Transmission Project has the potential to occur concurrently with the St. Vital Transmission Complex and may potentially overlap in time and space. Potential effects are primarily associated nuisance effects during the construction phase. The development of the required footprints for Bipole III, Manitoba Minnesota and additional residential development as part of Sage Creek would affect a localized area, be short-term in duration and would represent an incremental additive interaction. Potential effects associated with a change to property (e.g., property value) are primarily associated with the operations phase from the presence of the facilities. Future residential development would be limited to a local area on either side of an existing ROW and would be expected to follow municipal and/or provincial development guidelines to limit interactions with other Projects and mitigate project-related effects. No effects on property value are anticipated as a result of the Project in combination with other Projects; therefore, no additive interaction is anticipated.

A summary of the characterization of the cumulative effects on Property and Residential Development – Nuisance effects and Change to property, including the cumulative environmental effects with the project and the project contribution to cumulative effects, is presented in Table 9.12-7. The characterization of cumulative residual environmental effects are considered following the mitigation prescribed to minimize project effects, as well as any follow-up and monitoring recommended.

Cumulative effects to change in nuisance effects and change to property are not anticipated to cause an unacceptable change in property and residential development and are therefore rated not significant.

Table 9.12-7: Summary of Cumulative Residual Environmental Effects on Property and Residential Development

Cumulative Environmental Effect and Project Contribution		Cumulative Residual Environmental Effects Characteristics						Significance	Likelihood of Significant Effect
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Ecological/Socio-Economic Context		
Nuisance effects	Cumulative Effect with Project	A	L	L	ST/C	R	D	N	N/A
	Project Contribution to Cumulative Effect	A	L	L	ST/C	R	D	N	N/A
Change to property	Cumulative Effect with Project	A	L	L	P/C	I	D	N	N/A
	Project Contribution to Cumulative Effect	A	L	L	P/C	I	D	N	N/A

KEY:

Direction: P: positive; N: neutral; A: adverse

Magnitude: N: Negligible – no measureable change to property and residences; L: Low – minor measurable change to property and residences; M: Moderate – a measurable change but less than high; H: High – a substantial measurable change to property and residences.

Geographic Extent: PDA: Site-specific within the Project development area; L: Local: within the LAA; R: within the RAA.

Duration: ST: Short term; MT: Medium Term; LT: Long Term; P: Permanent – will not change back to original condition.

Frequency: O: Occasionally, once per month or less; S: Sporadic, once per week; R: Regular, more than once per week intervals; C: Continuous, regularly throughout the life cycle of the Project.

Reversibility: R: Reversible; I: Irreversible.

Ecological/Socio-Economic Context: U: Undisturbed, area relatively or not adversely affected by human activity; D: Developed, area has been substantially previously disturbed by human development or human development is still present; N/A, Not Applicable.

Significance: S: Significant; N: Not Significant.

Likelihood of Significant Effect: Based on professional judgment – L: Low, low probability of occurrence; M: Medium, medium probability of occurrence; H: High, high probability of occurrence; N/A, Not Applicable.

9.12.7 Follow-up and Monitoring

No follow-up and monitoring activities are planned for change to property and nuisance.

9.12.8 Summary

With careful pre-planning, considering private residences in the routing process, and the provision of compensation to directly affected property owners within the ROW, the effects of the Project on property and residential development are anticipated to be not significant.

9.13 AGRICULTURAL LAND USE

Agricultural land use was selected as a VC in recognition of its contribution to the local and provincial economies and its importance to landowners within the region.

This section assesses and evaluates the potential effects of the Project on current agricultural land use. As a linear development that would traverse a predominantly agricultural landscape, the Project has the potential to interact with agricultural land use within the Project area. In this section, the environmental effects of Project activities on agricultural land use resulting from construction, operation and maintenance are assessed.

9.13.1 Scope of Assessment for Agricultural Land Use

The scope of the environmental assessment of agricultural land use in consideration of the regulatory setting, potential project-VC interactions, and existing knowledge, is defined in the sections that follow.

9.13.1.1 Regulatory Setting

The scope of the assessment for agricultural land use is based on various municipal by-laws, Provincial Land Use Policies (see Section 6.4.6) and s.11 of the *Manitoba Environment Act*. Specifically, the assessment was prepared to meet the filing requirements and guidance for socio-economic effects.

9.13.1.2 Boundaries

The temporal boundaries for the assessment of the potential environmental effects of the Project on agricultural land use include the periods of construction, and operation and maintenance of the Project; see Section 3.7 for the Project construction schedule. Operation and maintenance of the Project will begin following construction and will be carried out until project decommissioning.

The spatial boundaries for the environmental effects assessment of agricultural land use include the Project Development Area (PDA), Local Assessment Area (LAA) and Regional Assessment Area (RAA).

The PDA is defined as the area within which all construction activities associated with the Project will take place. For this Project, the 40-m wide ROW constitutes the PDA. Direct effects of construction, and operation and maintenance are anticipated to be limited to the PDA.

The LAA is defined as a 2-km-wide corridor, centred along the ROW centreline. The LAA is the area where indirect or secondary environmental effects of construction, and operation and maintenance are likely to be most pronounced or discernible.

The RAA is the area within which cumulative environmental effects for Project construction and operation and maintenance may occur. The RAA is defined as the administrative districts, the southern portion of the City of Winnipeg and the seven RMs that occur within the vicinity of the Project.

The administrative boundaries for the assessment of agricultural land use pertain to the *Manitoba Planning Act* and the *Crown Lands Act* administered by Manitoba local government and the Lands Branch of Manitoba Conservation and Water Stewardship respectively.

The technical boundaries for the assessment of agricultural land use were based on a review of available information for the study area, including public and stakeholder engagement, mapping and property identification data.

9.13.1.3 Identified Issues and Concerns

Concerns regarding the environmental effects of the Project on agricultural land use were identified during the PEP. The greatest number of concerns were directly related to agriculture. Potential issues and questions associated with the potential effects of the Project on agricultural land use are primarily associated with how construction-related activities and the eventual presence of the transmission system may overlap physically with existing agricultural land uses. Comments focused on potential adverse effects of transmission towers and lines on agricultural operations and included:

- Loss of land from production.
- Damage to soils, crops and property (including buildings and shelter belts).
- Inconvenience, nuisance and increased production costs associated with operating farming equipment and crop production around structures.
- Interference with aerial spraying of crops.
- Effects on GPS units used in farming.
- Effects on livestock, particularly dairy cattle production.
- Compromised biosecurity for cropping lands and livestock operations.

9.13.2 Project Interactions with Agricultural Land Use

Project interactions with agricultural land use are identified in this section. Table 9.13-1 lists each Project activity and physical work for the Project, and ranks each interaction as 0, 1, or 2 based on the level of interaction each activity or physical work will have with agricultural land use.

Table 9.13-1: Potential Project Environmental Effects to Agricultural Land Use

Project Activities and Physical Works	Potential Environmental Effect	
	Change in Land Use	Effects on Livestock
Construction		
Clearing	2	1
Drilling	1	1
Marshaling Yards	1	1
Tower Installation	2	1
Stinging Conductors	2	1
Presence of materials and Equipment	1	1
Site Reclamation	2	1
Operation		
Project Presence	2	1
Maintenance of Infrastructure	1	0
Vegetation Management	1	1

KEY:

Project-related Environmental Effects were ranked as follows:

0 = No interaction.

1 = Interaction may occur; however, based on past experience and professional judgment, the resulting environmental effect is well understood and can be managed to acceptable levels through General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). No determination of significance of residual effects or cumulative effects assessment is warranted.

2 = Interaction may occur, and the resulting environmental effect may exceed acceptable levels without implementation of project-specific mitigation. Further assessment is warranted.

Only the interactions ranked as 2 in Table 9.13-1 are considered with respect to residual and cumulative effects and determination of significance further in the assessment of project-related environmental effects. A summary of the residual environmental effects on agricultural land use resulting from interactions ranked as 2 is provided in Section 9.13.5.4.

9.13.2.1 Justification and Rationale for Interactions Ranked as 1

9.13.2.1.1 Change in Agricultural Land Use

Interactions between change in agricultural land use and drilling, marshalling yards, and presence of materials and equipment during construction, as well as, maintenance of infrastructure and vegetation management during operation have been ranked as 1 in Table 9.13-1.

These activities have the potential to result in the reduction/alteration of available agricultural land, the disturbance/interruption of farming activities.

However, relative to farm-size, a small proportion of land will be lost or altered within the LAA. Affected farm-owners would also be compensated as appropriate.

9.13.2.1.2 Effects on Livestock

Apart from maintenance of infrastructure, ranked as 0, all interactions between the project activities and effects on livestock were ranked as 1. As discussed above, no further assessment of residual and cumulative effects or determination of significance is warranted. Concerns primarily relate to loss of grazing lands for animals, effects of stray or tingle voltage on dairy cattle and biosecurity.

It is anticipated that grazing land will be lost temporarily during construction as part of ROW clearance, and permanently during operation due to the presence of transmission line tower structures. It is estimated that approximately 28 ha or 4.5% of the PDA was under grazing land use in 2013 (AAFC 2013), which would approximate the maximum amount of land temporarily lost to grazing during construction. The grazing land area under tower structures is estimated to be approximately 0.1 ha. The total area removed from production is proportionally small in the context of overall farm size, and production even with the LAA and RAA; therefore, the corresponding effect is considered negligible. Livestock grazing is a relatively minor agricultural land use within the RAA and LAA, which is predominantly under annual crop production. Further, grazing can continue to the immediate base of structures. Some grazing lands may be seeded, sprayed or subject to other field operations, however, these activities typically occur sporadically and infrequently.

Agricultural buildings, including those associated with livestock operations, within 100 m of the edge of the ROW were included as criteria in the alternative and preferred route site selection process, and buildings associated with livestock operations within this corridor width were avoided

Stray voltage is defined as a phenomenon that can be found at low levels between two contact points in an animal confinement area where electricity is used (Wisconsin Department of Agriculture, Trade and Consumer Protection 2009). This is a concern for dairy operations where stray (or tingle) voltage can cause current to flow through cows which can create a disturbance in herds and result in reduced milk production. Stray voltage may originate from on-farm or off-farm sources (Manitoba Hydro 2006). The Electric Power Research Institute (EPRI 2012) states that stray voltage on dairy farms is primarily related to electrical current in wiring on the farm and the power distribution system that supplies the farm. Manitoba Hydro (2006) indicates that on-farm sources may include poor wiring, electrical short-circuits, defective underground cables, unbalanced loads, corroded neutral conductor connections, missing or inadequate grounding systems, and corroded or missing bonding connections. Stray voltage is not normally a power transmission issue because transmission line structure grounds are not generally connected to the distribution line grounds, and little current flows in transmission structure grounds except during faults (EPRI 2012). Correcting on-farm deficiencies should be conducted by a qualified electrician. If required, Manitoba Hydro will conduct an investigation using controlled, standardized test procedures to determine to what extent electrical distribution facilities or other off-farm sources contribute to stray voltage levels (Manitoba Hydro 2006). If abnormal conditions are found, Manitoba Hydro will take action to help reduce the level of stray voltage.

There are 10 dairy farms located within the LAA of the final preferred route, with the nearest dairy farm located about 434 m north of the centreline of the final preferred route, northeast of St.-Pierre-Jolys, MB and outside the PDA. Given the distance of the nearest dairy farm to the centreline, the potential for stray voltage effects on dairy cows is deemed negligible.

Other Project-related interactions with effects on livestock during construction and operational maintenance activities could relate to concerns for compromised biosecurity, particularly for hog and poultry operations. Biosecurity refers to a series of management practices and processes designed to reduce the risk of introducing and spreading disease agents (pathogens). The primary concern would be with external biosecurity which focuses on keeping disease agents from getting out into other farms. The Project has potential to impact livestock operation biosecurity through construction and/or maintenance activities requiring access to agricultural land.

To protect the biosecurity of livestock operations, Manitoba Hydro has developed an Agricultural Biosecurity policy to ensure the implementation of biosecurity protocols on their projects. Manitoba Hydro and contractors will follow the biosecurity policy where apllciable.

Communication with individual affected landowners/producers and local provincial agricultural representatives will help inform the Project team of specific biosecurity concerns in the Project area.

9.13.2.2 Selection of Environmental Effects and Measurable Parameters

The environmental assessment of agricultural land use is focused on the following environmental effect:

- Change in agricultural land use.

In this section, the environmental effects of Project activities on agricultural land use, including cumulative environmental effects, resulting from all phases of the Project, will be assessed.

Table 9.13-2 provides the measurable parameters used for the assessment of the selected environmental effect, and the rationale for selection.

Table 9.13-2: Measurable Parameters for Agricultural Land Use

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Change in Agricultural land use	Loss/alteration of agricultural land	The Project will result in the loss and alteration of agricultural land.
	Nuisance – Project conflicts with agricultural activities	The Project could interfere with the agricultural operations (e.g. aerial spraying, field operations [e.g., tillage, spraying, sowing], GPS usage).
	Land area with reduced yields (ha)	The Project may result in degradation of soils (e.g., compaction), resulting in reduced crop performance and yield.

The selection of measurable parameters in Table 9.13-2 was based on results of the PEP and the professional judgment of the Study Team.

9.13.3 Residual Environmental Effects Description Criteria

The EA methodology for agricultural land use is based on the determination of whether significant adverse residual environmental effects are likely to occur from the Project. Parameters listed in Table 9.13-3 will be used to characterize and evaluate residual environmental effects of the Project on agricultural land use.

Table 9.13-3: Characterization of Residual Environmental Effects for Agricultural Land Use

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The ultimate long-term trend of the environmental effect	**Positive** – an improvement of the capacity for agricultural land use.
		Adverse – a decrease in the capacity for agricultural land use.
		Neutral – no net change in the capacity for agricultural land use.
Magnitude	The amount of change in a measurable parameter or variable relative to baseline case	**Negligible** – no measurable change in the capacity for agricultural land use.
		Low – a very small measureable change in the capacity for agricultural land use.
		Moderate – measurable change but less than substantive.
		High – a substantive, measureable change in the capacity for agricultural land use.
Geographical Extent	The geographic area in which an environmental, economic, social, heritage, or health effect of a defined magnitude occurs	**PDA** – effects are restricted to the PDA and are considered site specific in nature
		LAA – effects extend into the LAA and are considered local in nature
		RAA – effects extend into the RAA
Duration	The period of time required until the VC returns to its baseline condition, or the effect can no longer be measured or otherwise perceived	**Short-term** – Effect restricted to Construction Phase
		Medium-term – Effect extends through the Operation Phase.
		Long-term – Effect extends beyond Project decommissioning.

Table 9.13-3: Characterization of Residual Environmental Effects for Agricultural Land Use

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		Permanent – measurable parameter unlikely to recover to baseline.
Frequency	The number of times during the project or a specific project phase that an environmental effect may occur	**Occasionally** – once per month or less
		Sporadic – once per week
		Regular – more than once per week intervals
		Continuous – regularly throughout the lifecycle of the Project
Reversibility	Reversibility pertains to whether or not the residual effect can be reversed once the physical work or activity causing the effect ceases	**Reversible** – effect is reversible following project decommissioning
Ecological/Socio-economic Context	The general characteristics of the area in which the project is located	**Undisturbed** – area relatively or not adversely affected by human activity
		Developed – area has been substantially previously disturbed by human development or human development is still present
Likelihood of Significant Effect	The likelihood that a significant effect will occur	**Low** – a low likelihood of the significant effect occurring
		Medium – a medium likelihood of the significant effect occurring
		High – a high likelihood of the significant effect occurring

9.13.3.1 Significance Thresholds for Residual Environmental Effects

A significant residual adverse environmental effect on agricultural land use is one where project activities will result in environmental effects on the land such that existing agricultural production cannot continue within and adjacent to the ROW at current levels for extended periods of time (i.e., beyond the construction phase) and cannot be adequately compensated.

9.13.4 Existing Conditions for Agricultural Land Use

This section presents information on existing conditions for the environmental effects assessment for agricultural land use. A regional overview of the agricultural statistical information, agricultural capability, crops grown and their acreages, livestock operations, and specialty agricultural land uses (including aerial application, irrigation, shelter belts, and organic farming) was presented in Chapter 6.4.1.1.

9.13.4.1 Baseline Data Sources

Baseline data were collected from federal, provincial and local government sources. Table 9.13-4 summarizes the objectives, methods, and data sources.

Table 9.13-4: Baseline Research Methods for Agricultural Land Use

Baseline Component	Objective and Outcome	Data and Approach
Agricultural land area in the PDA (i.e., 40-m-wide ROW)	Describe agricultural crop land use within the LAA and estimate the agricultural crop land area that could be affected by the Project within the PDA.	Calculate the total area in the PDA less the non-agricultural area using Federal Land Cover Class data[1]. Calculate areas associated with different agricultural land cover classes. Estimate area occupied by permanent project structures based on project description (Chapter 3).
Crops grown within LAA and PDA	Describe crops grown within the LAA and estimate areas of different crop types (e.g., row crop, cereal/oilseed crop) grown within the PDA.	Mapping of federal crop inventory within the LAA for most recent growing season (AAFC 2013).
Compaction risk within PDA	Describe the risk of compaction within the PDA (where physical disturbance of soil is most likely to occur) and identify areas at high risk for compaction.	Determine compaction risk ratings based on soil texture and drainage properties using provincial soils database, and mapping these ratings for the PDA.

Notes:
[1] Non-agricultural land area based on federal land cover classification data (Natural Resources Canada 2001).

9.13.4.2 Baseline Overview

9.13.4.2.1 Agricultural Land Removed from Production or Affected by the Project

Agricultural land will be affected during construction and operation phases of the Project. During construction, land within the PDA may be affected by construction activities or temporarily removed from production. During operations, the presence of project structures will result in some land within the PDA being permanently unavailable for agricultural use, while the presence of structures and the conductors may impact agricultural activities that occur within fields traversed by the transmission line.

Two data sources were used to characterize and quantify agricultural crop land use within the LAA and 40-m ROW.

- Federal land cover classification (LCC) data provides an indication of land cover classes from time to time including agricultural crop land cover classes of annual cropland, perennial crops (i.e., hayland) and pasture, and grassland[16].
- Agriculture and Agri-Food Canada (AAFC 2013) annual crop inventory is available on an annual basis and provides an indication of spatial distribution of individual crop types (e.g., wheat, barley, soybeans, corn, etc.).

The federal LCC data is useful to provide an indication of whether agricultural land is under annual crop production, perennial hay and pasture production or grassland, and can be considered a relatively static indicator of agricultural land cover classes. The AAFC annual crop inventory provides better resolution with respect to individual crop types being grown and their spatial location, but is a more dynamic agricultural land use indicator in that individual crop types and their spatial distribution may change substantively from year to year. However, it provides a useful indicator for the typical crop type mix within the LAA and PDA, and where these crop types are generally found, regionally.

Based on federal LCC data, 478 ha of agricultural land within the 40-m-wide ROW will be potentially affected by the Project. This area corresponds to 77.4% of the total area within the PDA (Table 9.13-5). This consists of approximately 396 ha (64.1%) of annual crop land, 69 ha (11.2%) of grassland, and 13 ha (2.1%) of perennial crops (i.e., hayland) and pasture. Land areas associated with each cover class within the LAA are also presented in Table 9.13-5, for comparative purposes. The distribution of land cover classes was presented for the RAA in Chapter 6 (see Map 6-3).

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[16] Grasslands may be used for livestock grazing.

Table 9.13-5: Agricultural Land Cover Classes within the LAA and ROW

Land Cover Class	LAA		PDA	
	Area (ha)	% of Area	Area (ha)	% of Area
Annual cropland	21,775	72.9	396	64.1
Grassland	3,629	12.2	69	11.2
Perennial Crops and Pasture	969	3.2	13	2.1
Other/Non-Agricultural[1]	3,478	11.7	140	22.7
Total[2]	**29,851**	**100.0**	**618**	**100**

Notes:

[1] Other/Non-Agricultural = Broadleaf dense, Open, Developed, Exposed, Herb, Shrub-Tall, and Water land cover types.

[2] Totals may not add up due to rounding.

Source: Natural Resources Canada (NRCAN) (2001). Land cover classification.

Annual cropping, including row crops, cereal crops and oilseed crops, is the dominant agricultural land use in the LAA (see Map 9-7). Based on information from the 2013 growing season (AAFC 2013), approximately 39.5% of the land within the PDA was sown to cereal and oilseed crops, with wheat (26.1%) having the greatest proportion, followed by canola (11.3%). Row crops occupied 24.3% of the PDA with soybeans, corn and sunflower occupying 18.2%, 5.2%, and 0.9% of the PDA, respectively (Table 9.13-6). Minor portions of the PDA were used for pasture/forage (11.2%) and grassland (4.5%). Land areas associated with each crop type within the LAA are also presented in Table 9.13-6, for comparative purposes, and were found to have similar areal distributions to the PDA.

Table 9.13-6: Crops Types within the LAA and PDA in 2013

Crop Type		LAA		PDA	
		Area (ha)	% of Area	Area (ha)	% of Area
Row Crop	Soybeans	6,813	22.8	113	18.2
	Corn	2,110	7.1	32	5.2
	Sunflower	452	1.5	6	0.9
Cereal/Oilseed Crop	Wheat	7,896	26.5	161	26.1
	Canola	3,857	12.9	70	11.3
	Oats	510	1.7	8	1.3
	Barley	47	0.2	4	0.6
	Flax	27	0.1	1	0.2
	Rye	2	<0.1		
Fallow	Fallow	70	0.2	1	0.2
Pasture/Forage	Pasture/Forage	3,003	10.1	69	11.1

Table 9.13-6: Crops Types within the LAA and PDA in 2013

Crop Type		LAA		PDA	
		Area (ha)	**% of Area**	**Area (ha)**	**% of Area**
Grassland	Grassland	1,862	6.2	28	4.5
Non-Agricultural	Urban	1,528	5.1	102	16.5
	Broadleaf	1,449	4.9	22	3.5
	Water	146	0.5	3	0.5
	Shrubland	6	<0.1		
	Wetland	25	0.1		
	Unclassified	21	0.1		
Total[1]		**29,851**	**100.0**	**618**	**100.0**

Notes:
Table values are ordered by crop type category then by areas within LAA occupied by each crop type.
[1] Totals may not add up due to rounding.
Data Source: Agriculture and Agri-Food Canada. 2013. Annual Crop Inventory for Canada, 2013.

Based on the project description, it is anticipated that structures will be placed approximately 250 m apart, for a total of approximately 6.4 structures every mile. Two types of structures[17] are proposed for use within areas of agricultural land use:

- Self-supporting lattice-steel structures will be used along the Southern Loop and will have a footprint of 6.3 m x 6.3 m.
- Tubular steel H-frame structures will be used in agricultural areas between St. Vital Station and Letellier Station and will be 6-9 m wide at the base.

Using the areas for each crop type in 2013 (Table 9.13-6), approximate line lengths for each crop type were estimated. It is estimated that approximately 553 structures will occur within agricultural lands (Table 9.13-7), with close to half of these structures occurring under cereal/oilseed crop land (based on 2013 crop type data).

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[17] Not considering specialized heavy-angle and dead-end structures.

Table 9.13-7: Approximate Number of Tower Structures by Crop Type (2013)

Crop Type	Approximate Line Length	Approximate No. of Structures
	km	#
Row Crop	47	188
Cereal/Oilseed Crop	62	248
Forage/Pasture/Grassland	24	97
Totals	**133**	**533**

9.13.4.2.2 Soil Compaction Risk

Soil compaction is the reduction of soil pore space due to the force exerted by moving vehicles and equipment. Generally, soil compactability increases with higher clay content, higher moisture content, lower organic matter content, and increasing load. Soil compaction is an issue of concern within the ROW, where construction equipment and work vehicle traffic is expected.

A generalized rating system for compaction and rutting risk was developed by Stantec using professional judgment and review of two compaction systems that had been designed for forestry applications, including the Soil Compaction and Puddling Hazard Key (British Columbia Ministry of Forests 1999) and Compaction and Rutting Hazard for Soils in Ontario (Archibald et al. 1997). The compaction and rutting risk matrix takes into consideration texture and drainage regime. The generalized soil compaction risk ratings are presented by soil textural class and drainage class in Table 9.13-8, below.

Table 9.13-8: Soil Compaction Risk Ratings

Drainage	Textural Class					
	Very Coarse (S, LS, LFS)	Moderately Coarse (SL, FSL)	Medium (VFSL, L, SiL)	Moderately Fine (SCL, CL, SiCL, Si)	Fine/Very Fine (SC, SiC, C, HC)	Organic
Rapid	Low	Low	-	-	-	-
Well	Low	Low	Low	Moderate	Moderate	
Imperfect	Low	Low	Moderate	High	High	
Poor	Moderate	Moderate	High	High	High	
Very Poor	--					High

NOTES:

S=sand, LS = loamy sand, LFS = loamy fine sand, SL = sandy loamy, FSL = fine sandy loam, VFSL = very fine sandy loam, L = loam, SiL = silt loam, SCL = sandy clay loam, CL = clay loam, SiCL = silty clay loam, Si = silt, SC = sandy clay, SiC = silty clay, C = clay, HC = heavy clay

Within the final preferred route ROW, soil compaction risk was found to be predominantly rated as High (78.1%), with the remaining area rated as Moderate (2.3%) and Low (3.7%) (Table 9.13-9, Map 9-8) The predominantly high compaction risk is due to the combination of fine to very-fine textured soils and imperfectly to poorly drained soils found within the ROW.

Table 9.13-9: Soil Compaction Risk within the ROW

Soil Compaction Risk	Area (ha)	Proportion of Total Area
Low	23	3.7
Moderate	14	2.3
High	483	78.1
Not rated[1]	98	15.8
Total[2]	**618**	**100.0**

Notes:

[1] Not rated = Unclassified land; Urban land or Water.

[2] Totals may not add up due to rounding.

9.13.5 Project Environmental Effects on Agricultural Land Use

The project-related agricultural land use concerns which were raised during the PEP were primarily related to loss of agricultural land for production, damage to soil, crops and property, including buildings and shelter belts, inconvenience/nuisance and increased production costs associated with operating farm equipment around structures, effects on GPS units in farming equipment, and interference with aerial spraying of crops. Compromised biosecurity during project activities was also identified as a concern for producers.

During project planning and design, Manitoba Hydro sought to proactively anticipate and avoid the potential for adverse interactions between the Project and agricultural land use, as well as any associated adverse biophysical and socioeconomic effects that may result from such interactions to the extent possible. The Project transmission system will be similar to other existing transmission infrastructure in the province, and Manitoba Hydro will use standard practices and procedures and will follow applicable regulatory requirements during the construction and operational phases of the Project.

Some key environmental effects management measures that relate to the potential for change in agricultural land use include the following:

- Designing, planning and scheduling project-related elements and activities in specific areas to avoid interactions with high-quality agricultural land to the extent practical.

- Consultation with relevant stakeholders and individuals, such as agricultural land owners. For example, contact with agricultural land owners prior to accessing land during construction will allow for site-specific concerns to be addressed (e.g., soil conditions, biosecurity issues).

Manitoba Hydro Landowner Compensation Program

Manitoba Hydro will mitigate effects of the Project on agricultural land use to the extent practical. However, residual project effects are anticipated as a result of construction and operation activities and works, including the physical presence of the project structures and conductors. These effects may include such things as temporary and permanent land loss, damage to crops and property, ongoing nuisance to farmers, and direct and indirect effects on the use of property. Compensation will be provided to landowners in consideration of these residual effects. The aspects of the compensation program are outlined in Manitoba Hydro's brochure entitled "230-kilovolt Transmission Line Landowner Compensation Information" (Manitoba Hydro, date unknown), and are summarized below.

There are four different types of compensation available to affected landowners:

- Land Compensation – to landowners granting an easement for the ROW.
- Construction Damage Compensation – to landowners for damages caused by construction activities.
- Structure Impact Compensation – to landowners for each tower located on agricultural lands.
- Ancillary Damage Compensation – to landowners where Manitoba Hydro's use of the ROW directly or indirectly effects the use of property.

Where there is a need to acquire property easements, Manitoba Hydro will seek to identify, contact and communicate with the owner in a timely manner.

Land Compensation is a one-time payment to landowners for granting of an easement for a transmission line ROW. The one-time payment is determined based on the total land area (acres) of easement required, the current market value of the land (per acre), and the easement compensation factor. For 230-kilovolt transmission lines, Manitoba Hydro's compensation factor is 75% of current market value.

Construction Damage Compensation is a one-time payment available to landowners who experience damage to their property due to construction, operations and maintenance of the transmission line, and is negotiated with landowners. This compensation is used to address damage and repair to property, remedial works (e.g., rejuvenation of compacted soil), and damage to crops.

Structure Impact Compensation is a one-time payment to landowners for tower placement on land classified as agricultural. Manitoba Hydro prepares a compensation schedule semi-annually based on current data provided by Manitoba Agricultural Services Corporation. The one-time payment compensation schedule is applicable for the referred to semi-annual period on the basis of the capitalization of the total annual costs as a percentage rate equivalent to the returns rate posted for a three-year GIC established by a majority of Canada's five largest chartered banks. Manitoba Hydro establishes a one-time payment rate per tower for the year it is placed on the farmer's land. This payment covers:

- Crop losses on lands permanently removed from production.
- Reduced productivity in an area of overlap around each tower structure.
- Additional time required to manoeuvre farm machinery around each structure.
- Additional application of seed, fertilizer and weed control in the area of overlap around each tower structure.

The Structure Impact Compensation considers four types of agricultural land (natural hayland, seeded hay land, cereal crop land and row crop land, the type of tower structure and the location of the tower structure in relation to property lines.

Ancillary Damage Compensation is a one-time payment that applies where Manitoba Hydro's use of the ROW directly or indirectly effects the use of the property. These payments are negotiated and compensation may be provided to landowners for agricultural effects (e.g., irrigation and aerial spraying).

9.13.5.1 Assessment of Change in Agricultural Land Use

9.13.5.1.1 Construction Effects – Change in Agricultural Land Use

This section assesses Project potential effects that are associated with interactions between the following construction-related activities and physical works, and change in agricultural land use which were ranked as 2 (Table 9.13-1):

- Clearing
- Tower Installation
- Stringing Conductors
- Site Reclamation

Right-of-way clearance for the Project has the potential to impact property such as buildings and shelterbelts, as well as result in temporary loss of land for crop production during the construction phase of the Project.

Within the PDA, there are two agricultural buildings affected in the St. Norbert area and another two agricultural bins affected in the RM of Franklin (NE8-2-3E).

It is estimated that six shelterbelts will be affected by the Project as follows:

- One shelterbelt perpendicular to the line and one shelterbelt parallel to the line approximately 3 km northeast of Grande Pointe.
- Three shelterbelts perpendicular to the line approximately 4 km northeast of Niverville.
- One shelterbelt southeast of Letellier Station.

It is estimated that temporary loss of agricultural land could amount to annual cropland up to 396 ha in area, perennial crops and pasture up to 13 ha in area, and grassland up to 69 ha in area (see Table 9.13-5).

Construction activities (clearing, tower installation and stringing of conductors) within the ROW have the potential to affect land productivity due to the occurrence of soil-degrading processes such as compaction, rutting, and admixing, and, to a lesser extent and degree, erosion. Physical land degradation in affected areas of the ROW may result in reduced crop productivity and/or increased costs associated with additional field work activities (e.g., additional tillage, leveling, etc.) to return land productivity. Effects on production values is crop type and crop dependent – generally row crops have higher production value than oilseeds and cereals, and oilseeds and cereals have higher production values than haylands and pastures (see Chapter 6, Figure 6.4-2). Therefore, the effects of temporary loss of land will be highest for row crops and least for haylands and pastures.

The timing of construction will also influence the extent of effects to agricultural land cleared for the ROW. Construction in the winter when soils are frozen, during the summer if soils are dry, or late fall after harvest if soils are dry, will reduce the effects from rutting, compaction and admixing. On the other hand, conducting construction activities when the soil is wet will increase the potential for soil degradation via the previously discussed processes and enhance the potential for yield reduction in subsequent growing seasons. Soil degradation might also occur if soils stripped during construction (e.g., around tower structures, or marshalling yards) are not adequately protected from increased levels of erosion, from either wind or water. Spring-melt and dry, fall periods are generally the periods when soils are most susceptible to erosion losses; however, erosion may occur whenever soils are not frozen or adequately protected by cover. Soil erosion would be less of concern during winter construction. Clearing and construction is anticipated to occur between March and June for the St. Vital Station to Letellier Station portion of the line, and November to December for the La Verendrye Station to St. Vital Station portion of the line.

Cropland biosecurity refers to a series of management practices and processes designed to minimize or control the introduction, spread and release of pests, such as noxious weeds, soil-borne insects/invertebrates (e.g., soybean cyst nematode) and plant diseases (e.g., clubroot). High-value, specialty crops such as organic crops, are especially susceptible to contamination (Wisconsin DATCP 2009).

Soil transport is an important mechanism for the spread of these pests from one field or region to another. There is potential for soil to be transferred from field to field, or from another region to the Project area, during the construction phase of the Project, via construction equipment, other vehicles and people moving between fields. The introduction of pests can have lasting adverse production value (reductions in yield) and production cost (increased input and management costs) effects. In areas of clay soils, which generally characterizes the LAA, procedures include scheduling activities when ground conditions are favourable, pressure washing equipment to remove soil, cleaning and disinfecting safety footwear, and record keeping. Communication with individual affected landowners/producers and local provincial agricultural representatives will help inform the Project team of specific biosecurity concerns in the Project area.

Based on the information provided by Manitoba Water Stewardship Division, the final preferred route of the Project will not traverse irrigated land. As a result, concerns regarding construction of transmission lines on irrigated land (e.g., splitting of an irrigated field into multiple management units and inability to operate an irrigation system at full capacity), are not applicable and this issue is not assessed further herein.

9.13.5.1.2 Mitigation

As summarized above, a few agricultural buildings are affected by the Project PDA. Residences, commercial buildings and shelterbelts were criteria in the routing process which were weighted against other criteria attempting to minimize overall effects.

Construction timing, such as construction in agricultural lands outside of the growing season, will help avoid or reduce temporary losses of agricultural land and damage to growing crops. Clearing and construction for the La Verendrye Station to St. Vital Station portion of the line between November and December will avoid the growing season, while there will be some overlap with the growing season for the clearing and construction of the St. Vital Station to Letellier Station portion of the line between March and June.

Manitoba Hydro has general Environmental Protection mitigation measures which are designed to minimize the impact of construction activity on agricultural lands, which will be implemented on the Project.

To protect biosecurity of agricultural lands, Manitoba Hydro has developed an Agricultural Biosecurity policy to ensure the implementation of biosecurity protocols on their projects. Manitoba Hydro will follow their SOPs for Biosecurity on Agricultural Land is discussed in Section 9.13.2.1.2.

A summary of effects and specific mitigation is provided in the Table 9.13-10 below.

Table 9.13-10: Construction – Mitigation and Residual Effects

Environmental Effects	Mitigation	Residual Effects
Damage to property including buildings and shelterbelts	• Routing to minimize impact to existing buildings and shelterbelts • Minimize construction during the growing season to avoid damage to crops, o the extent possible • Provide compensation based on one-time payment should damage occur	• Damage, though compensated, may still occur
Temporary loss of agricultural land	• Construction timing to avoid/reduce overlap with growing season • Provide compensation based on one-time payment	• With the implementation of the proposed mitigation, there is no anticipated residual effect
Yield reduction due to soil degradation (e.g., soil compaction, rutting, admixing, erosion)	• Construct line when soils are dry, where possible, to minimize compaction, rutting and admixing • Provide compensation if yield reduction occurs	• With the implementation of the proposed mitigation, there is no anticipated residual effect
Compromised biosecurity	• Follow corporate policy on biosecurity and implement biosecurity SOPs on Project • Communication with landowners/producers and local ag reps regarding biosecurity concerns prior to construction activities	• With the implementation of the proposed mitigation, there is no anticipated residual effect

9.13.5.1.3 Characterization of Residual Change in Agricultural Land Use During Construction

A summary of the environmental effects assessment and prediction of residual environmental effects resulting from interactions with agricultural land use that were ranked as 2 (Table 9.13-1) is provided in Table 9.13-11. Activities with the potential to result in substantive residual environmental effects are Clearing, Tower Installation, Stringing Conductors, and Site Reclamation.

The likely residual effects of Project construction on agricultural land use are as follows:

- **Direction:**
  - Adverse, as construction will cause disruptions to agricultural activities.
- **Magnitude:**
  - Of low to moderate magnitude because the land area affected by construction of the Project will be small compared to that currently used for agriculture, and because Project design, associated consultation and / or permitting procedures will serve to identify and address most issues in a timely manner.
- **Geographic Extent:**
  - Local to site specific in geographic extent, as most if not all relevant interactions will occur within the LAA, and particularly, at the site of construction activity (i.e., within PDA) as it occurs.
- **Frequency/Duration:**
  - Of medium-term duration, as many disturbances (such as ROW clearing or infrastructure placement) will continue throughout the construction phase of the Project, with potential for effects lasting into the operations phase of the Project (e.g., soil degradation from compaction).
  - Of continuous frequency as certain disruptions (e.g., Clearing and Tower Installation) will extend throughout the construction phase and beyond.
- **Reversibility:**
  - Effects will be Reversible following project decommissioning
- **Ecological/Socio-Economic Context:**
  - Of Disturbed ecological/socio-economic context as effects occur in an area of previous disturbance and presence of human development

There is a high degree of certainty in these effects predictions given the general nature of the Project, the management strategies proposed, and experience with similar projects.

9.13.5.1.4 Operations and Maintenance Effects – Change in Agricultural Land Use

This section considers the potential effects of the proposed Project on agricultural land use during operations and maintenance. Effects associated with this phase of the Project are primarily related to Project presence and include land removed from production, nuisance, inconvenience and increased production costs associated with farming around structures (e.g., overlapping seed, fertilizer and pesticide application), farm management unit splits, interference with aerial spraying of crops, effects on the use of GPS, and biosecurity concerns.

Such effects are not site specific and will be present throughout the location of the transmission line in agricultural areas. Concerns related to the removal of agricultural land from production relate to the surface area taken up by the structures themselves. Land under structure footprints will be permanently removed from production.

Crops will be lost on lands that are permanently removed from production by transmission line structures. However, because the total area removed from production is small relative to the average farm size, the corresponding effect on land loss from having transmission lines in fields is minimal (Webb 1982). Throughout Manitoba, farming activities persist close to the immediate base of structures; farmers can work close to the structures to maximize crop produced and to reduce the area taken out of production. However, some farmers are not typically able to farm right up to the tower edge due to the large size of equipment and the nature of field operations. It has been noted by others that buffers around square-based tower footprints should be considered in the range of 1 to 2 m (Nielsen 2012) and 3 m (Serecon Valuations Inc. 2010). While Nielsen demonstrated the appropriateness of the smaller buffer for typical grain production systems in Manitoba in a recent study, a larger buffer is likely more reasonable when considering row crops (e.g., soybeans, corn, sunflower), which occupied approximately 24% of the PDA in 2013, due to limitations in approach distances due to the nature of the field equipment and operations.

Based on the project description, self-supporting steel-lattice tower footprints will be 6.3 m x 6.3 m, while tubular steel H-frame structures will be 6-9 m wide. Wisconsin Department of Agriculture, Trade and Consumers Protection (DATCP 2009) estimated areas of production lost around tubular caisson (i.e., single pole) structures. While the diameters evaluated were less than the width of the base of the tubular steel H-frames proposed, review of the estimated areas of production losses and extrapolation to structures with widths of approximately 6-9 m, it is reasonable to assume similar land area would be affected by the H-frames as by the self-supporting steel-lattice structures. Therefore, the following analysis is based on calculations using the steel-lattice structures with base dimensions of 6.3 m x 6.3 m.

Using the line length and tower numbers presented previously (Table 9.13-7), buffered areas that should be considered permanently removed from production by crop type grown in 2013 are outlined in Table 9.13-11, below. Areas of land considered permanently removed from production range from 2.1 ha when no buffer is considered, to 8.1 ha when a 3 m buffer is considered. The largest areas impacted are associated with cereal/oilseed crops, then row crops, then forage/pasture/grassland.

Farmers will also face challenges related to nuisance, inconvenience and increased production costs associated with navigating around the tower structures (e.g., in between the Project and other boundaries, including property boundaries) with farm equipment during various agricultural field operations.

Previous studies have found that approximately 70% of the costs of structures to farmers were the result of the non-productive area or area lost for production around the tower (Gustafson et al. 1979; Scott 1981; Wisconsin DATCP 2009), while 30% of the costs were the result of lost time, crop damage and increased input costs from double coverage (Scott 1981; Wisconsin DATCP 2009).

Table 9.13-11: Estimated Areas of Permanent Land Loss by Crop Type (2013) from Tower Structures Considering Different Buffer Areas

Crop Type	Total Footprint of Structures (6.3 m x 6.3 m per tower)	Total Footprint of Structures including 1-m buffer (8.3 m x 8.3 m per tower)[1]	Total Footprint of Structures including 2-m buffer (10.3 m x 10.3 m per tower)[1]	Total Footprint of Structures including 3-m buffer (12.3 m x 12.3 m per tower)[2]
	ha			
Row Crop	0.7	1.3	2.0	2.8
Cereal/Oilseed Crop	1.0	1.7	2.6	3.8
Forage/Pasture/Grassland	0.4	0.7	1.0	1.5
Totals	**2.1**	**3.7**	**5.7**	**8.1**

Notes:

[1] Buffer of 1-2 m used by (Nielsen 2012).

[2] Buffer of 3 m around tower by Serecon Valuations Inc. (2010).

In a recent report, Nielsen (2012) summarizes estimated costs associated with farming around obstacles determined by Accutrak Systems Ltd. (1991) to be $20.00 around small or very small obstacles, and no more than $42.00 around larger obstacles (e.g., slough several acres in size). These figures were adjusted for inflation to 2010 dollars.

The following is a summary of costs to farm around transmission line tower structures reported in Wisconsin DATCP (2009):

- Cost estimates to farm around structures in Montana, including farm operations of pesticide and fertilizer application, planning, crop spraying, harvesting and post-harvest harrowing, and based on 2007 prices were: $13-16/structure for mono-poles at the edge of the field; $40/structure for H-frames at the field edge; $177/structure for H-frames in the field interior; and $150/structure for mono-poles in the field interior (Hydro Solutions Inc. and Fehringer Agricultural Consulting Inc. 2007).
- Another study found the cost for a field in spring wheat in 2007 for an H-frame at the field edge would be $14.99 (Thornton 2007).

- A study conducted in Ontario in 1974-75 crop prices and considering yield losses for wheat, soybean, grain corn and silage corn, found costs to work around twin poles in a field to be in the order of $14-$18 per year [$69-$89 per year in 2014 dollars] (Scott 1981).
- Average costs per structure in 1982 Canadian dollars were found to be approximately $50 for dryland grain production [$117 per structure in 2014 dollars], which was estimated to equate to a reduced market value of $2,500 per quarter section, considering loss in perpetuity from altered land use and considering 2.5 structures per quarter section (Thompson and Phillips 1983).

Due to technical, economic and environmental factors it is unavoidable that this Project will overlap and interact with agricultural land use and properties in specific areas, it is anticipated that the physical presence of the Project will have greater negative impact on agricultural production than the actual land taken out of production by the structures. The presence of transmission lines in fields is a nuisance and an inconvenience to farmers. Extra effort is required to work around structures and there are risks inherent with operating farm machinery in proximity to the structures. Farmers and operators should be attentive to avoid such structures. The presence of structures will be considered during planning and executing field operations.

The growth of weeds around tower bases is a concern to agricultural producers. These areas will not be sprayed during typical field operations and weeds may grow, allowing weed seeds to disperse into adjacent field areas, creating a production nuisance for producers.

Farm management units, or field areas managed as a single management unit, may be split by the Project PDA. An example of where this may occur is if the PDA is not located along the edge of the field or along the half mile line for quarter section field management units, or if it is located along a half mile line and it dissects a half section field management unit. These situations may result in different management being required within a field management unit that was previously managed as a single unit. In these situations, an example of effects to management would be only part of the previous field management unit being available for aerial spraying, with the split area having to be sprayed with a ground rig. These situations would likely escalate production costs.

Aerial application of pesticides is an important practice within the RAA, due to trafficability of the fine to very-fine textured and imperfectly to poorly drained soils, and the high-value crop production (see Chapter 6 for areas of high likelihood for aerial application based on soil texture and drainage properties).

Transmission towers and conductors pose a safety risk to aerial application pilots and their aircraft, as do any other tall above ground infrastructure. However, the presence of a transmission line within an agricultural field requires pilots to maintain a safety buffer between their working area within the field and the transmission line. This results in a portion of the field adjacent to the transmission line that is not available for aerial application. If possible, alternate field management needs to be conducted within these areas. If ground spraying can occur in these areas, ground spraying can be conducted at additional cost (i.e., equipment, time, reduced crop production) and nuisance to the producer. In some cases, ground spraying may not be possible in these areas, for example due to unsuitable soil conditions during wet periods. In these cases, these areas will go unsprayed resulting in increased pest pressures in these areas in the given and subsequent years. In some cases, producers may have to consider alternate cropping in these areas (e.g., field unit split or change to management of the quarter section field), however this is not anticipated to be required in the majority of cases.

The following list consists of project concerns raised by Manitoba Association of Aerial Applicators regarding aerial application activities in a letter submitted to the project team (Alarie 2013):

- Up to 131,000 hectares (325,000 acres) of cropped land within the region of the study area could be sprayed in a year, with some crops receiving multiple applications each growing season.
- At least 14 airstrips, which are used by aerial applicators for aerial spraying, are located within the region of the study area.
- The study area is dominantly comprised of prime agricultural land which would likely be associated with high-value crop production and extensive aerial application of crop protection products.
- For every mile of transmission line going through prime agricultural land, 18 acres of land cannot be sprayed by air.
- Operators lose 80 additional acres of application every time a transmission line makes a change in direction.
- If a transmission line goes through a field at an angle or across a series of river lots, the negative financial impact to the farmer and the aerial applicator is much greater.
- Operational costs to farmers and aerial applicators increase from lost time and higher carbon footprint.

Based on the fourth bullet above, a buffer distance of approximately 75 ft (22.5 m) or corridor of approximately 150 ft (45 m) around a transmission line is not available for aerial application. This represents approximately 3% of the field area and just over 2% of the LAA corridor width. While “minor” in area relative to a field or the LAA, these are important areas with respect to management of fields, as described above.

The minimization of diagonal crossings was an important consideration during the routing process. Within the fixed route of the Southern Loop an approximate stretch of 2.5 km of diagonal crossing of agricultural land occurs within the City of Winnipeg limits. Another diagonal crossing affects approximately 1.5 km of agricultural land where the Project crosses the Floodway. Very short diagonal crossings (i.e., ~100 m) were required within agricultural land where the Project crosses PTH 59 and within a corner of a field just east of Niverville. Another diagonal crossing was required immediately south of Letellier as the Project enters the Letellier Station – this diagonal parallels PTH 75. The loss of land for aerial application associated with these diagonals is specific to the length of the diagonal, and the location and nature of the diagonal in relation to the agricultural field management unit.

Aerial applicator airstrips were considered during the routing process to reduce, to the extent possible, potential conflicts between airstrips and the transmission line.

Interference of transmission lines with the precision technology of GPS units that are currently used or could be used in the future, in farming equipment, is a concern for producers. Farmers rely on GPS to provide guidance to field operations as well as supporting “auto-steer” functionality. In precision agriculture, farmers can apply inputs, e.g., fertilizer, seed and pesticides, at variable rates in different parts of a field to reflect the variable soil and landscape properties within the field. As a result, precise calibration of field equipment according to in-field soil and landscape variability has the potential to enhance the economical application of inputs, optimizing returns from an individual field. Since precision agriculture requires consistent contact between the equipment-mounted GPS and satellites in order to determine field location, interference of the GPS signal by external sources of fields might affect precision of field operations (Wisconsin DATCP 2009). According to Wisconsin DATCP (2009), the possibility of transmission line interference with GPS signals is highly unlikely based on extensive measurement and theoretical analysis by J. Michael Silva of Montana Alberta Tie Ltd.

In 2011, Manitoba Hydro conducted an independent study to analyze the ability of GPS receivers, the survey grade receivers typically used for precision farming, to operate under high voltage direct current power lines. This study concluded that very minor adverse effects on GPS receiver performance could be measured or detected from either the overhead lines or the structures that support the actual lines. The study confirmed that GPS data collected by the receivers had not been compromised (Manitoba Hydro 2011). Manitoba Hydro also has noted that GPS units also function at a very different frequency than AC transmission lines and that there should be no interference with satellite-based GPS systems.

Biosecurity would also be a concern for croplands during transmission line operation since there is potential for soil to be transferred from field to field during the operation phase of the Project, during maintenance activities if vehicles and people are moving between fields. The introduction of pests can have lasting adverse production value (reductions in yield) and production cost (increased input and management costs) effects.

9.13.5.1.5 Mitigation

Manitoba Hydro has general Environmental Protection Practices which are designed to minimize the impact of operation and maintenance activity on agricultural lands, which will be implemented on the Project.

Placement of transmission line structures within the ROW will result in removal of agricultural land from production for the lifetime of the Project, which can be considered as permanent loss of the affected agricultural land (see Table 9.13-11). As the transmission line is routed primarily through agricultural land, permanent loss of agricultural land is unavoidable. Structure impact compensation will be provided to landowners for each tower located on agricultural lands as mitigation for production losses associated with land removed from production for the lifetime of the Project (MB Hydro, date unknown).

Design mitigation was employed to reduce the effects of the Project on nuisance/inconvenience to producers and increased production costs where the PDA intersects agricultural cropland. The diagonal crossing of the land was avoided to the extent possible. Diagonal crossings are limited to the existing corridor associated with the Southern Loop and a few other instances which are generally associated with existing linear disturbances (e.g., highways). Individual occurrences of diagonal crossings within agricultural land were detailed in the section above. Further, the centreline was routed along half-mile lines and along field edges to the extent possible.

Additional challenges faced by farmers due to the nuisance, inconvenience and increased costs associated with navigating around the tower structures with farm equipment during various agricultural field operations would be mitigated using a one-time payment which is covered under structure impact compensation. This compensation covers reduced productivity in an area of overlap around each tower structure, additional time required to manoeuvre farm machinery around each structure, and double application of seed, fertilizer, and weed control in the area of overlap around each tower structure (MB Hydro, date unknown).

Field severance, due to farm-management unit splits, would remain for the lifetime of the line and be associated with increased unit management effort, something undesirable for the affected landowners. Routing of the line was conducted in a manner to reduce the potential for field management unit splits, including minimizing diagonal field crossings, and routing along half-mile lines and along field boundaries, to the extent possible. Individual occurrences of diagonal crossings within agricultural land were detailed in the section above.

Similarly, routing of the line was conducted to reduce effects to aerial application of pesticides, including avoiding diagonal crossings and routing the line along field boundaries and half-mile lines, to the extent possible. Individual occurrences of diagonal crossings within agricultural land were detailed in the section above.

To protect biosecurity of agricultural lands, Manitoba Hydro has developed and will follow an Agricultural Biosecurity policy to ensure the implementation of biosecurity protocols on their projects, as described in Section 9.13.2.1.2.

Manitoba Hydro requires access to the PDA from time to time for routine transmission line maintenance. Manitoba Hydro will access agricultural areas of the PDA outside of the growing season. If Manitoba Hydro requires access to the PDA during the growing season, which would typically be in the case of an emergency, compensation for crop losses and/or soil damage will be provided based on the site-specific activity and effects.

Table 9.13-12 provides a summary of specific mitigation and residual effects for agricultural land use during Project operations and maintenance.

Table 9.13-12: Operations and Maintenance – Mitigation and Residual Effects

Environmental Effect	Mitigation	Residual Effect
Land is removed from production	• Provide compensation	• Land is permanently removed from production
Cost to farm around the structures; yields will be reduced due to overlap, and there will be increased production costs (e.g., increased crop inputs from overlap)	• Provide compensation	• Annual crop loss for as long as the line is in place
Nuisance and inconvenience from farming around the structures	• Provide compensation	• Nuisance and inconvenience fromfmaring around the structures
Weeds may an issue around structures and yields may be reduced.	• Manitoba Hydro provides one-time compensation that accounts for additional weed control required by producers	• Annual crop loss for as long as the line is in place
Farm management unit splits.	• Routing to avoid/reduce diagonal crossings, parallel field boundaries (e.g., edge of road rights of way, half-mile lines) • Provide compensation	• Annual crop loss or increased production costs for as long as the line is in place
Structures and conductors interfere with aerial spraying	• Routing to avoid/reduce diagonal crossings, parallel field boundaries (e.g., edge of road rights of way, half-mile lines) • Provide compensation to landowners	• Inconvenience and loss of yield (it may be too wet to ground spray)
GPS Interference	• None	• Not anticipated
Compromised biosecurity	• Follow corporate policy on biosecurity and implement biosecurity SOPs on Project	• With the implementation of the proposed mitigation, there is no anticipated residual effect

Table 9.13-12: Operations and Maintenance – Mitigation and Residual Effects

Environmental Effect	Mitigation	Residual Effect
	• Communication with landowners/producers regarding biosecurity concerns prior to accessing land	

9.13.5.1.6 Characterization of Residual Change in Agricultural Land Use During Project Operation and Maintenance

A summary of the environmental effects assessment and prediction of residual environmental effects resulting from interactions with agricultural land use that were ranked as 2 in Table 9.13-1 is provided in Table 9.13-13 below. The activity with the potential to result in substantive residual environmental effects is Project presence.

The likely residual effects of Project operations and maintenance on agricultural land use are as follows:

- **Direction:**
  - Adverse, as the presence of Project infrastructure will disrupt agriculture.
- **Magnitude:**
  - Of low to moderate magnitude, as in many cases the land area occupied by the Project will be small compared to that used by or available to existing users, and because Project design, consultation and / or other effects management measures will serve to identify and address most issues.
- **Geographic Extent:**
  - Local to site specific in geographic extent, as most if not all Project interactions will occur within the LAA, and particularly, at the Project sites and immediately adjacent areas (i.e., within the PDA).
- **Duration/Frequency:**
  - Of permanent duration as the presence of the PDA, structures and conductors will continue throughout the life of the Project.
  - Of continuous frequency as some disruptions, such as nuisance to farmers, will occur throughout the life of the Project.

- **Reversibility:**
  - Effects will be Reversible following project decommissioning.
- **Ecological/Socio-Economic Context:**
  - Of disturbed ecological/socio-economic context as effects occur in an area of previous disturbance and presence of human development.

There is a high degree of certainty in these effects predictions given the general nature of the Project, the management strategies proposed, and experiences with similar projects.

9.13.5.2 Summary of Project Residual Environmental Effects on Agricultural Land Use

The combined residual environmental effects on agricultural land use are predicted to be adverse and not significant (Table 9.13-13).

9.13.5.3 Determination of Significance of Residual Environmental Effects

Significant residual environmental effects are considered to be those that cause a change in the VC that will alter its status, integrity and future viability beyond an acceptable level. For the agricultural land use VC, significant adverse environmental effects as a result of the Project are defined as follows:

A significant residual adverse environmental effect on agricultural land use is one where project activities will result in environmental effects on the land such that existing agricultural production cannot continue within and adjacent to the ROW at current levels for extended periods of time (i.e., beyond the construction phase) and cannot be adequately compensated.

Environmental effects that do not meet this above criteria are considered not significant. Project components will occupy areas currently used for agricultural land use but these occupied areas will be a small proportion of the total land available for agriculture within the RAA. Project design, consultation, permitting, communications, routing and the effects management measures (outlined in Sections 8.13.5.2 and 8.13.5.3) will address issues to the extent feasible. Given the relatively small amount of land taken up by the transmission line ROW (40 m), the large amounts of land available for agricultural production within the RAA and the and mitigation planned by Manitoba Hydro, it is anticipated that the Project will not result in a substantive decrease in the current level of agricultural activity. Where disruption to agricultural activities occurs, or land is removed from production, temporarily or permanently, the compensation program is designed to adequately compensate producers for this land loss and/or disruption. Therefore, the effects of the Project on the agricultural land use are not likely to be significant.

Table 9.13-13: Summary of Residual Project-related Environmental Effects on Agricultural Land Use

Potential Residual Environmental Effects for Project Activities and Physical Works	Proposed Mitigation/Compensation Measures	Residual Environmental Effects Characteristics						Significance	Likelihood of Significant Effects	Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Ecological/Socio-Economic Context			
Change in Agricultural Land Use										
Construction – Clearing, Tower Installation, Stringing Conductors and Site Reclamation	• Where construction cannot occur during the winter months, construction will be undertaken under dry soil conditions, where possible • Construction on agricultural cropland will be undertaken to reduce overlap with growing season • Access to lands will be maintained where possible • Follow corporate biosecurity policy and implement biosecurity SOPs on Project • Provide compensation where appropriate	A	L/M	PDA/LAA	MT/C	R	D	N	N/A	Continue to liaise with individual land owners, and local agricultural reps (for regional biosecurity concerns) throughout the construction phase.
Operation and Maintenance – Project Presence	• Provide compensation where appropriate • Follow corporate biosecurity policy and implement biosecurity SOPs on Project • Communicate with landowners/ producers regarding biosecurity	A	L/M	PDA/LAA	LT/C	R	D	N	N/A	Continue to liaise with individual land owners, and local agricultural reps (for regional biosecurity concerns) throughout the operation and maintenance phase. Crop performance

Table 9.13-13: Summary of Residual Project-related Environmental Effects on Agricultural Land Use

Potential Residual Environmental Effects for Project Activities and Physical Works	Proposed Mitigation/Compensation Measures	Residual Environmental Effects Characteristics						Significance	Likelihood of Significant Effects	Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Ecological/Socio-Economic Context			
	concerns prior to accessing land									monitoring, where deemed necessary. Site-specific monitoring and follow-up for crop performance and biosecurity issues, as required.

KEY:

Direction: P: positive - an improvement of the capacity for agricultural land use; N: neutral - no net change in the capacity for agricultural land use; A: adverse - a decrease in the capacity for agricultural land use.

Magnitude: N: Negligible - no measurable change in the capacity for agricultural land use; L: Low - a very small measureable change in the capacity for agricultural land use; M: Medium - measurable change but less than substantive; H: High- a substantive, measureable change in the capacity for agricultural land use.

Geographic Extent: PDA—effects are restricted to the PDA and are considered site specific in nature; LAA—effects extend into the LAA and are considered local in nature; RAA—effects extend into the RAA.

Duration: ST: Short term - Effect restricted to Construction Phase; MT: Medium Term - Effect extends through the Operation Phase; LT: Long Term - Effect extends beyond Project decommissioning; P: Permanent – measurable parameter unlikely to recover to baseline.

Frequency: O: Occasionally - once per month or less; S: Sporadic - once per week; R: Regular - more than once per week intervals; C: Continuous - regularly throughout the lifecycle of the Project.

Reversibility: R: Reversible – effect is reversible following decommissioning of the project; I: Irreversible – effect is irreversible.

Ecological/Socio-Economic Context: U: Undisturbed, area relatively or not adversely affected by human activity; D: Developed, area has been substantially previously disturbed by human development or human development is still present; N/A, Not Applicable.

Significance: S: Significant; N: Not Significant.

Likelihood of Significant Effect: Based on professional judgment – L: Low, low probability of occurrence; M: Medium, medium probability of occurrence; H: High, high probability of occurrence; N/A, Not Applicable.

9.13.6 Cumulative Environmental Effects on Agricultural Land Use

This section consists of an evaluation of the effects of the Project on agricultural land use in combination with the effects of other projects or activities that will likely overlap spatially and temporally with those of the Project. The focus of this cumulative effects assessment is on those residual project effects identified in the section above. These effects are considered in relation to the past, current and reasonably foreseeable future projects and actions listed in the table below, to evaluate the potential for the effects from the Project to act cumulatively in a manner that could cause a change in the VC that will alter its status or integrity beyond an acceptable level, relative to the established threshold.

The potential for interaction between the effects of the Project on agricultural land uase and the effects of other identified past, current and future projects are presented in Table 9.13-14. Projects will have an interaction ranked as 0 if Project environmental effects do not overlap spatially and temporally with those of other projects and activities, and, therefore, do not have the potential to act cumulatively with those of other projects and activities. Interactions ranked as 1 are Project environmental effects that act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). Interactions ranked as 2 are those interactions where Project environmental effects act cumulatively with those of other projects and activities, and may exceed acceptable levels without the implementation of project-specific or regional mitigation.

Table 9.13-14: Potential Cumulative Environmental Effects on Agricultural Land Use

Other Projects and Activities with Potential for Cumulative Environmental Effects		Potential Cumulative Environmental Effect
		Change in Agricultural Land Use
Infrastructure Projects	PTH 59 Twinning	1
	PTH 52 Twinning	1
	PTH 75 Rehabilitation	0
Residential Projects	Sage Creek Residential Development	0
Energy Projects	Manitoba-Minnesota Transmission Project	1
	Bipole III Transmission Project	1
	St. Joseph Windfarm Project	1

Table 9.13-14: Potential Cumulative Environmental Effects on Agricultural Land Use

Other Projects and Activities with Potential for Cumulative Environmental Effects	Potential Cumulative Environmental Effect
	Change in Agricultural Land Use

KEY:

Cumulative environmental effects were ranked as follows:

0 = Project environmental effects do not act cumulatively with those of other projects and activities.

1 = Project environmental effects act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of beneficial management or codified practices.

2 = Project environmental effects act cumulatively with those of other projects and activities and the resulting cumulative effects may exceed acceptable levels without implementation of project-specific or regional mitigation.

9.13.6.1 Assessment of Cumulative Effects on Agricultural Land Use

9.13.6.1.1 Infrastructure Projects

The rehabilitation of PTH 75 is not considered to have potential to act cumulatively with the effects of the Project on agricultural land use as the rehabilitation project is not anticipated to result in further changes to agricultural land use.

The twinning of PTH 59 and PTH 52 is planned for construction in the future and will traverse the Project route and will potentially overlap temporally with the Project. Both PTHs overlap spatially with the Project. PTH 59 runs south of Winnipeg and intersects with the proposed Project three times, while PTH 52 intersects the Project once, just southeast of Tourand.

The highway twinning projects would result in relatively larger areas of permanent agricultural land loss within the RAA compared with the Project. The Project will result in an estimated permanent agricultural land loss due to the presence of tower structures ranging from 2.1 ha when the footprint of the tower bases only are considered (i.e., 6.3-m x 6.3-m footprint) to 8.1 ha when a buffer area of 3 m around the tower bases are considered (i.e., 12.3-m x 12.3-m footprint).

While there will be an additive effect of permanent agricultural land loss considering these projects, the additive effect of the Project will be relatively small, hence the ranking of 1 for the potential cumulative effects of the Project and twinning of PTH 59 and PTH 52 infrastructural project.

9.13.6.1.2 Energy Projects

Transmission

While the construction phases of the proposed Manitoba to Minnesota Transmission Project (MMTP) and Bipole III Transmission Project (BPIII) are not anticipated to overlap temporally with the Project, there will be temporal overlap between other phases, including operations phases for all three projects. There will be spatial overlap between MMTP and BPIII and the Project. The BPIII project crosses the proposed Project ROW once, south of Niverville. This portion of the BPIII transmission route includes a crossing of the Red River and traverses mostly agricultural cropland.

Route selection for MMTP is still in process. The proposed route shares the Southern Loop corridor with the Project, and traverses the Project RAA in the RM of Tache.

Permanent agricultural land loss associated with these projects is very small in relation to the agricultural land within the RAA. As described above, the Project will result in an estimated permanent agricultural land loss due to the presence of tower structures ranging from 2.1 ha to 8.1 ha.

The most important cumulative effect of these projects is alteration of agricultural land use; for example, reduction in land area available for aerial application. The land area affected is very small in relation to the area of agricultural land within the Project RAA. Further, compensation is provided to the landowner for the nuisance/inconvenience and increased production costs for all Manitoba Hydro transmission projects in the RAA, hence the ranking of 1 for the potential cumulative effects of the Project and the BPIII and MMTP projects.

Wind Energy

The St. Joseph Windfarm is located near St. Joseph, Manitoba, west of PTH 75, south of PTH 14 and north of PR 421. This windfarm currently consists of 60 2.3-MW turbines and will overlap spatially and temporally with the Project. The St. Joseph Windfarm is situated in a predominantly agricultural landscape, where most turbines have been situated on annual cropland.

The permanent land loss associated with these projects is very small in relation to the agricultural land within the RAA. Permanent land loss associated with the windfarm consists of tower footprints and short access roads. As a result, the potential for cumulative effects from the Project and the St. Joseph Windfarm was ranked as 1.

The most important cumulative effect of these projects is alteration of agricultural land use; for example, reduction in land area available for aerial application. While the land area affected is larger than the area of permanent land loss, it is still very small in relation to the area of agricultural land within the RAA, and compensation will be provided for the nuisance/inconvenience and increased production costs for the Project to landowners and landowners are compensated for this loss on the St. Joseph Windfarm project.

9.13.6.2 Summary of Project Cumulative Environmental Effects on Agricultural Land Use

The total cumulative effect to agricultural land use consists of permanent loss of agricultural land under project footprints and alteration of land use and nuisance associated with the energy projects (transmission projects and wind energy projects). The overall magnitude of the change in land use is considered low to moderate as the measureable change of land use within the context of the regional assessment area is very small to less than substantive, due to the predominantly agricultural land use within the regional assessment area. The changes to agricultural land use are considered irreversible throughout the life of the projects considered. The project contribution to total cumulative effects considering permanent land loss is relatively small compared to infrastructure projects (i.e., highway twinning), while the contribution to alteration in land use (e.g., reduction in land available for aerial application of pesticides) is higher, however is still very small in relation to the agricultural land within the regional assessment area. Compensation is provided to agricultural producers for land loss and alteration of land use.

A summary of the characterization of the cumulative effects on agricultural land use, including the cumulative environmental effects with the project and the project contribution to cumulative effects, is presented in Table 9.13-15. The characterization of cumulative residual environmental effects are considered following the mitigation prescribed to minimize project effects, as well as any follow-up and monitoring recommended.

Cumulative effects to the change in agricultural land use are not anticipated to result in environmental effects such that existing agricultural production cannot continue within the regional assessment area at current levels for extended periods of time and cannot be adequately compensated, and are therefore rated not significant.

Table 9.13-15: Summary of Cumulative Residual Environmental Effects on Agricultural Land Use

Cumulative Environmental Effect and Project Contribution		Cumulative Residual Environmental Effects Characteristics						Significance	Likelihood of Significant Effect
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Ecological/Socio-Economic Context		
Change in Agricultural Land Use	Cumulative Effect with Project	A	L/M	R	LT/ C	I	D	N	N/A
	Project Contribution to Cumulative Effect	A	L/M	PD A/L	LT/ C	R	D	N	N/A

KEY:

Direction: P: positive - an improvement of the capacity for agricultural land use; N: neutral - no net change in the capacity for agricultural land use; A: adverse - a decrease in the capacity for agricultural land use.

Magnitude: N: Negligible - no measurable change in the capacity for agricultural land use; L: Low - a very small measureable change in the capacity for agricultural land use; M: Medium - measurable change but less than substantive; H: High- a substantive, measureable change in the capacity for agricultural land use.

Geographic Extent: PDA—effects are restricted to the PDA and are considered site specific in nature; L – local, effects extend into the LAA and are considered local in nature; R – regional, effects extend into the RAA.

Duration: ST: Short term - Effect restricted to Construction Phase; MT: Medium Term - Effect extends through the Operation Phase; LT: Long Term - Effect extends beyond Project decommissioning; P: Permanent – measurable parameter unlikely to recover to baseline.

Frequency: O: Occasionally - once per month or less; S: Sporadic - once per week; R: Regular - more than once per week intervals; C: Continuous - regularly throughout the lifecycle of the Project.

Reversibility: R: Reversible; I: Irreversible.

Ecological/Socio-Economic Context: U: Undisturbed, area relatively or not adversely affected by human activity; D: Developed, area has been substantially previously disturbed by human development or human development is still present; N/A, Not Applicable.

Significance: S: Significant; N: Not Significant.

Likelihood of Significant Effect: Based on professional judgment – L: Low, low probability of occurrence; M: Medium, medium probability of occurrence; H: High, high probability of occurrence; N/A, Not Applicable.

9.13.7 Follow-up and Monitoring

Follow-up and monitoring may be warranted from time-to-time on a site-specific basis if issues related to biosecurity (e.g., weed spread), for example, arise within the Project ROW. Due to the site-specific nature of these issues, the follow-up and monitoring program needs to be developed and tailored to the specific issue.

9.13.8 Summary

With implementation of the proposed mitigation measures and Manitoba Hydro's compensation program, the effects of the Project on agricultural land use are not anticipated to be significant.

9.14 NON-AGRICULTURAL LAND USE

This section assesses and evaluates the potential effects of the Project on current non-agricultural land use and associated resource use activities. As a relatively long, linear development, the Project has the potential to interact with land and resource uses and users in the RAA. Questions and concerns regarding possible interactions and environmental effects were identified during the PEP through consultation with government departments and agencies, Aboriginal communities, stakeholder groups and the general public.

As the Project traverses land that is principally agricultural in nature, there will be few interactions with non-agricultural land use within the RAA. As a result, this VC has not been accorded a rank of 1 and is, therefore, not subject to further assessment for residual and cumulative effects. Despite the predominance of agricultural land use, the lands and resources within and adjacent to the Project are used for other purposes. Non-agricultural land uses include those lands and activities identified for recreational purposes (campgrounds, wayside parks, picnic areas, trail areas, lodges), lands set aside for protection or used for commercial and domestic purposes (provincial parks, forests, wildlife management areas, outfitter areas), and lands designated as Crown land (community pasture) or Federal land (i.e., First Nation Reserve, treaty land entitlement parcels). Some lands are protected by provincial legislation (e.g., Wildlife Management Areas [WMA], Provincial Parks, Provincial Forests) for their particular ecological and cultural importance or designated under federal (First Nation's Land) legislation. Such areas that occur within the RAA include the St. Malo and Rat River WMAs, Duff Roblin Heritage Park, St. Malo Provincial Park and the Roseau River First Nation Reserve. These various land uses and designations are further discussed in the Baseline Overview (9.14.4.2) and the Effects Assessment Sections (9.14.5). Non-Agricultural land use and its associated recreational and cultural pursuits are an important component of the human environment within Manitoba. The success, enjoyment and sustainability of many land and resource use activities are related to the availability and quality of, and access to such lands.

9.14.1 Scope of Assessment for Non-Agricultural Land Use

9.14.1.1 Regulatory Setting

The scope of the assessment for non-agricultural land use is based on the requirements for applications under s.11 of *The* (Manitoba) *Environment Act*. Specifically, the assessment was prepared to meet the filing requirements and guidance for socio-economic effects.

9.14.1.2 Boundaries

The temporal boundaries for the assessment of the potential environmental effects of the Project on non-agricultural land use include the periods of construction and operation and maintenance of the Project; see Section 3.7 for the Project construction schedule. Operation and maintenance of the Project will begin following construction and will be carried out until project decommissioning.

The spatial boundaries for the environmental effects assessment of non-agricultural land use include the Project Development Area (PDA), Local Assessment Area (LAA) and Regional Assessment Area (RAA).

The PDA is defined as the area within which all construction activities associated with the Project will take place. The PDA includes 119 km of transmission line between St. Vital Station and Letellier Station, and 37 km of transmission line between St. Vital Station and La Verendrye Station, and upgrades at the station sites (Map 9-9). For the purposes of this assessment, various ROW were used, including 64-m-wide ROW between St. Vital Station to the city limits, a 40-m-wide ROW extending from the city of Winnipeg to Letellier Station, and a 34-m-wide ROW for the Southern Loop corridor emanating from La Verendrye Station.

The LAA is defined as the PDA area plus an additional 500-m buffer adjacent to that area on each side. The LAA is the area where indirect or secondary potential environmental effects of construction and operation and maintenance are likely to be most pronounced or discernible. For this VC, the RAA corresponds to the municipal jurisdictions traversed by the Project. The technical boundaries included limitations in scientific information, data analyses, and interpretation. Information provided in this assessment is based on that available through federal, provincial, and municipal government databases and information provided by individuals through the PEP.

9.14.1.3 Identified Issues and Concerns

Potential issues and questions associated with the potential effects of the Project on non-agricultural land use were identified through the PEP. Issues are associated with how construction-related activities and the eventual presence of the transmission system, may overlap physically with existing land uses on the landscape, as well as how Project activities and components may generally disturb and affect the quality of the environment and enjoyment of outdoor pursuits. Specific concerns relate to habitat alteration and potential effects on trails and bird watching.

9.14.2 Project Interactions with Non-Agricultural Land Use

Table 9.14-1 lists each activity and physical work for the Project, and ranks each interaction as 0, 1, or 2 based on the level of interaction each activity or physical work will have with non-agricultural land use.

Table 9.14-1: Project Interactions with Non-Agricultural Land Use

Project Activities and Physical Works	Potential Environmental Effect
	Change in Non-Agricultural Land Use
Construction:	
Clearing	1
Drilling	1
Marshalling Yards	1
Tower Installation	1
Stringing Conductors	1
Presence of Materials and Equipment	1
Site Reclamation	1
Operation and Maintenance:	
Project Presence	1
Maintenance of Infrastructure	1
Vegetation Management	1

KEY:

Project-related Environmental Effects were ranked as follows:

0 = No interaction.

1 = Interaction may occur; however, based on past experience and professional judgment, the resulting environmental effect is well understood and can be managed to acceptable levels through General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). No determination of significance of residual effects or cumulative effects assessment is warranted.

2 = Interaction may occur, and the resulting environmental effect may exceed acceptable levels without implementation of project-specific mitigation. Further assessment is warranted.

9.14.2.1 Justification and Rationale for Interactions Ranked as 1

All activities are ranked as 1 as they can be managed and mitigated to acceptable levels using standard Manitoba Hydro design and construction practices. For instance, stringing conductors at the Red River crossings (near the south city limit of Winnipeg and southeast of Letellier) have the potential to temporarily interfere with recreational and other navigation on the Red River; however, conductor stringing will meet or exceed the clearance requirements of Overhead Systems, C22.3 Standard No. 1-10 (CSA 2010) for watercourse crossings (see Sections 3.2.1.5 3-6 and Section 3.3.1.4).

9.14.3 Residual Environmental Effects Description Criteria

Potential environmental effects of all Project-related activities on non-agricultural land use were ranked as 1 in Table 9.14-1, therefore, no residual environmental effects description criteria or significance thresholds are defined for this VC.

9.14.4 Existing Conditions for Non-Agricultural Land Use

This section presents a high-level summary of information on existing conditions of non-agricultural land use. For a detailed description of baseline conditions, see Section 6.4.5.

9.14.4.1 Baseline Data Sources

Information on non-agricultural land use in the RAA was obtained through a desktop study. The desktop sources include:

- A review of relevant provincial and municipal websites.
- GIS-based model maps.
- Input from the Project PEP.

These sources, combined with extensive experience and consultation, were used to identify the various types of non-agricultural land use within the RAA.

9.14.4.2 Baseline Overview

Recreational Land Use

Recreation and tourism activities occur in some areas and include hunting, fishing, camping, snowmobiling and other recreational pursuits.

The Duff Roblin Parkway Trail is a multi-year landscaping and recreational development on the expanded Floodway. The trail network, located on the west side of the Floodway, begins near St. Mary’s Road Bridge in the south and ends just south of Lockport to the north. In the future, the trail will link to the new Duff Roblin Provincial Park at the Floodway inlet. Public staging areas are located at the provincial park and at Prairie Grove located on the northwest side of the PTH 59 South Highway Bridge. Other features include a community garden plot east of the St. Mary’s Road Bridge on the east side of the Floodway.

St. Malo Provincial Park is also located towards the south of the RAA. Classified as a recreational park, it provides opportunities for camping, swimming and boating and is a popular site amongst residents in the area. Individuals have the opportunity to utilize the St. Malo and Debonair campgrounds which are located in the vicinity of the park.

Several rivers within the RAA provide anglers with a variety of fish species. These include the Red, La Salle, Seine, Rat, and Roseau Rivers, and Joubert Creek. The regulated fishing season is open most of the year with the exception of spawning season from April 1 to May 10.

Designated recreational canoe routes within the RAA include the Red River Historic River and Riviere Aux Rats Canoe Route. The Riviere Aux Rats canoe route commences near Carrick and proceeds to the junction with the Red River north of St. Agathe, before proceeding north and terminating in St. Boniface in Winnipeg. The Red River was nominated as a Historic River in 2005 under the Canadian Heritage Rivers System for its cultural, recreational and natural heritage values.

Snowmobiling is a popular recreational pursuit within the RAA. In conjunction with local clubs, Snowmobilers of Manitoba Inc. (SnoMAN) develop and maintain a network of trails with the goal of promoting safe and environmentally responsible snowmobiling. Numerous trails traverse the RAA in north-south (St. Adolphe to Jean Baptiste) and east-west (Carey to Aubigny) orientations (SnoMAN 2013). A number of recreational walking trails also occur within the vicinity of the proposed route, the most well-known being the historic TransCanada trail (Map 9-9).

Tourism activities in the RAA are primarily focused on various outdoor recreation pursuits, canoeing, wildlife viewing (e.g., birding), nature interpretation (i.e., wildlife management areas), Aboriginal traditional experiences, agricultural events, local cultural festivals and historical trips.

Protected Areas, Parks and Conservation Lands

Manitoba's Protected Area Initiative (PAI) is administered by Manitoba Conservation and Water Stewardship (MCWS). With the mandate to protect Manitoba's biological diversity by designating a series of Crown lands as ecological reserves, provincial parks, WMAs and provincial forests. All resource development and agricultural activities are prohibited in these areas, although hunting, trapping and fishing are permitted.

Within the RAA, there is a new designated provincial park – Duff Roblin Heritage Park. The park was given heritage status and is located appropriately at the Floodway gate and diversion channel, which are key components to Winnipeg's flood protection infrastructure. The park serves as a staging area for access to recreation trails, tobogganing, fishing and viewing opportunities. The Southern Loop corridor currently crosses over and adjacent to the Duff Roblin Heritage Park. The ROW through this area, consisting of a Manitoba Hydro easement, crosses the portion of the heritage park that has an "Access" land use categorization to accommodate future hydro transmission lines (A System Plan for Manitoba Parks 2008).

The Province of Manitoba also designates specific WMAs for "better management, conservation and enhancement of the wildlife resources of the province". Similar to the PAI, WMAs exist to protect wildlife, the environment and promote people's enjoyment of natural areas. Hunting and trapping are generally permitted in WMAs but may be subject to restrictions or prohibited in some areas.

The St. Malo WMA, located in the southern extent of the RAA and approximately 3.2 km east of the final preferred route, is a cooperative wildlife management area characterized by flat to gently rolling topography. The WMA has a good cover of aspen-oak forest with remnants of tallgrass prairie. The St. Malo WMA protects habitat for deer, ruffed grouse and neo-tropical birds. There are two distinct geographical components of the St. Malo WMA. The east unit is adjacent to the west side of PTH 59 while the west unit can be accessed on the TransCanada Trail, starting from the town or St. Malo or the village of Carlowrie. Most of this unit is forest but there is a large wetland in the northwest corner.

Resource Use

Agriculture is the dominant resource use in southern Manitoba and is addressed in Section 9.13.2. No forestry management licences are issued within the RAA. Manitoba Conservation administers domestic forest utilization through the issuance of timber permits. Most timber permits on Crown land are issued for fuelwood purposes. Some landowners may privately manage their own woodlots on their own properties. Areas which allow restricted hunting within the RAA include WMAs and undesignated Crown lands. The RAA encompasses two Game Hunting Areas (GHAs) GHA 33 and 35A. Commonly hunted species include white-tailed deer, water-fowl and upland game birds. In addition, the final preferred route in the RAA crosses through the Open Trapping Area Zone 1 in southern Manitoba. Typical furbearing species which are harvested in this zone include badger, coyote, fox, raccoon, beaver, muskrat and weasel.

Local resource use activities within the RAA consist of fishing, berry picking, and likely wood gathering (firewood). Residents likely participate in traditional (recreational and subsistence) fishing throughout the region. Berries of interest in southern Manitoba include Saskatoon berry, raspberry, and strawberry. There are a few U-Pick farms located in the RAA, notably in the Sanford, La Salle, and St. Norbert areas, and at Grunthal.

9.14.5 Project Environmental Effects on Non-Agricultural Land Use

Potential environmental effects of all Project-related activities on non-agricultural land use were ranked as 0 or 1 in Table 9.14-1; therefore, no determination of significance of residual or cumulative environmental effects are conducted for this VC.

Transmission lines have the potential for both negative and positive implications for non-agricultural land use. Land and resource use activities may be affected by development projects both directly and indirectly. Direct effects occur where established activities are disturbed, or otherwise interfered with, by Project-related components or activities during the construction or operation phase (e.g., reduced access to recreation areas). Indirect effects can occur when a project adversely affects the resource user’s quality of experience.

9.14.5.1 Assessment of Change in Non-Agricultural Land Use

9.14.5.1.1 Construction Effects

Station Modifications

Modifications to both the St. Vital and La Verendrye stations will occur within existing fenced station sites. As such, there will be no expected Project-related effects on non-agricultural land use.

230-kV Transmission Lines

Recreation and Tourism

The route selection process sought to minimize the effect of the final preferred route on recreation and tourism developments and activities. The route, where feasible, was selected to avoid displacing or passing within close proximity to lodges, cottage subdivisions, cottages and recreation sites/trails.

There are no lodges in immediate proximity to the route for the 230 kV lines. Similarly, no cottage subdivisions are in close proximity to the final preferred route.

Watercourses crossed by the final preferred route are fished recreationally, including the Seine River, Rat River, Joubert Creek, Roseau River, and the Red River (Map 9-9). Potential effects to sport fishing as a result of transmission line construction at river crossings can include: effects on fisheries habitat; effects on surface water quality (i.e., erosion or pollutants); and increased access to and exploitation of fish resources.

Potential effects on habitat and water quality will be negligible with mitigation implemented at water course crossings. The size of the workforce during construction can lead to an increase in fish harvest from water bodies along the transmission line; however, the size of the workforce during construction is not anticipated to be of a scale to have an effect. The line follows, or is in close proximity to existing linear facilities through much of its length and therefore access to these water bodies will not be increased. Existing sport fishing regulations are in place to address any potential for an increase in fishing pressure.

The final preferred route crosses the Rat River in the RM of De Salaberry which is a designated canoe route. The Red River, which is a designated Canadian Heritage River, is crossed by the final preferred route between the RMs of Franklin and Montcalm. No concerns were raised with crossing of these rivers during the PEP.

The 230-kV transmission line crosses a number of designated snowmobile trails in the vicinity of communities, including: north of Grande Pointe along the Floodway; south of Ile des Chenes in the RM of Ritchot; southeast of St. Pierre-Jolys at PR 205 and along PTH 59 in the RM of De Salaberry; southwest of St. Malo north of PR 217 in the RM of Franklin; and west of PTH 75 south of Letellier in the RM of Montcalm.

Two recreational trails are located along the final preferred route (Map 9-9). The first, the Duff Roblin Parkway Trail which is under development, is located along the Floodway. The trail will commence at Duff Roblin Heritage Park located at the Floodway inlet in Winnipeg. The park trail system will eventually extend all the way to Lockport. In addition to the trail, there is a trail staging area located at Prairie Grove, along the east side of PTH 59 at the Floodway crossing which is crossed by the final preferred route for the Southern Loop 230-kV transmission line. There is also a proposed community garden plot which is to be located along the south Floodway berm lands east of the St. Mary's Road Bridge. The second trail along the final preferred route is the TransCanada Trail which is crossed and paralleled for approx. 4.0 km in the RM of De Salaberry. No concerns were raised during the PEP on these trail crossings. During one stakeholder workshop, a representative of the TransCanada Trail expressed an interest in co-location of the trail with the transmission line.

No campground areas are affected by the final preferred route. A local recreational facility, consisting of eight baseball diamonds, is located in the city of Winnipeg to the south of the existing ROW in the St. Norbert area. Southwood Golf Course, also in St. Norbert, is located on the north side of the Southern Loop corridor. The corridor pre-dates the development of the golf course. In addition, an area identified as a local picnic area is located in proximity to the final preferred route, west of PTH 75 and south of Letellier in the RM of Montcalm. While undeveloped at this time, it appears that an existing transmission line already crosses through this same area. These recreational facilities are not expected to be adversely affected by the Project.

Navigation

Overhead transmission lines are of potential interest to Transport Canada under the *Navigation Protection Act* (NPA). The principle aim of the NPA is to ensure unimpeded navigation on Canada's busiest navigable waterways. Hydro transmission lines are considered for their potential effects to navigation under the NPA. Manitoba Hydro will adhere to all CSA clearance guidelines for the construction of the transmission lines at waterbodies for the Project.

The Project crosses the Red River at two locations: one east of Letellier and one near the City of Winnipeg south city limit. The Red River is considered a "Scheduled Water" under the provisions of the *Navigation Protection Act*. Manitoba Hydro will be submitting the location of the crossing for review to Transport Canada and believes that there will be no effect to navigation. No mitigation measures are required.

Resource Use

With respect to the 230 kV transmission line, the issue of increased access for resource use is not expected to be an issue in southern agricultural Manitoba. Two GHAs are crossed by the final preferred route, GHA 33 and 35A. There are no operating lodges located in proximity to the final preferred route.

The final preferred route crosses through the Open Trapping Area Zone 1 in southern Manitoba. Construction activities may temporarily displace wildlife from areas in proximity to the ROW due to sensory disturbance (i.e., construction noise) and may potentially disrupt trapping activity. During the PEP, comment was received from the public related to a concern that construction could disrupt furbearing animals and affect trapping. Anticipated effects in any one area are considered to be small, limited in aerial extent (project footprint), and short-term in duration.

The effect of the transmission line on managed private woodlots is limited in the RAA. The final preferred route crosses in close proximity to only one managed woodlot, within 250 m, south of PR 205 in the RM of Hanover. Any effect would be small and limited in aerial extent.

Aboriginal Lands and Interests

There is one First Nation in proximity to the final preferred route, Roseau River First Nation, east of the Red River and north of the proposed ROW in the RM of Franklin. During the Aboriginal engagement process, members of the Peguis First Nation and Roseau River First Nation provided comments with respect to routing, specifically related to use of existing transmission corridors, Crown lands and whether TLE lands had been identified. Typical ‘areas of least preference’ for Manitoba Hydro in routing transmission lines includes: selected TLE sites, Federal land, and First Nation Reserves. Manitoba Hydro does not avoid Provincial Crown land. The final preferred route does not cross the Roseau River Reserve and is approximately 4 km to the west of Roseau River Rapids. TLE selections for Roseau River were included in the route selection process.

No existing First Nation Reserve land, trust lands, treaty land entitlement parcels, or community interest zones are crossed or directly affected by the final preferred route. No effects are anticipated on First Nation lands from construction and operation from the 230 kV transmission line.

Comment was also received during the Aboriginal engagement process with respect to the environment in general, related to whether there would be environmental impact on the land or in the future. Manitoba Hydro indicated that there could be effects related to agricultural lands, wildlife habitat, hunting access, snowmobile and ATV access, all of which could be viewed as either positive or negative. These components are considered in the environmental assessment, which includes identifying measures to avoid or mitigate these issues where possible.

The final preferred route crosses through GHAs 33 and 35A which are recognized by the Province of Manitoba as areas for Métis natural resource harvesting. Métis harvesting within southern Manitoba encompassing the RAA includes small mammal harvesting, big game (deer) harvesting, fishing, and gathering. Disturbance effects can arise from direct impact on the resources or through undesired access to the resource by other parties. The level of resource harvesting and gathering activity is not expected to be affected in the Project area due to the availability of existing access. Anticipated adverse effects on resource use from clearing and construction activities in any one area are considered low, local and limited in aerial extent and short-term in duration.

Designated Protected Areas, Areas of Special Interest and Ecological Reserves

The final preferred route does not cross through any designated protected areas, proposed protected areas (Areas of Special Interest [ASIs]) or ecological reserves, nor are they in close proximity. Organizations contacted during the PEP through Key Person Interviews included representation from Manitoba Conservation and Water Stewardship (Forestry, Wildlife, Parks and Natural Areas and Water Stewardship). Representatives from Manitoba Conservation and Water Stewardship and Park System Planning and Ecology attended the stakeholder workshops convened for the Project. No specific areas of concern were identified, other than noting that avoidance of forested areas and wetlands should be a routing consideration. No effects on protected areas, ASIs or ecological reserves are anticipated from construction and operation of the 230 kV lines.

Provincial Parks and Wildlife Management Areas

The final preferred route crosses adjacent to and through one new designated provincial park – Duff Roblin Heritage Park located at the Floodway inlet. The ROW through this area, consisting of a Manitoba Hydro easement, crosses the portion of the heritage park that has an “Access” land use categorization to accommodate future hydro transmission lines (A System Plan for Manitoba Parks, 2008). Duff Roblin Heritage Park will be affected by the construction and physical presence of the line during operation and maintenance. During construction, an EnvPP for the line will be used to manage work in proximity to the designated heritage park. The next closest provincial park to the route is St. Malo Provincial Recreation Park located east of PTH 59 at St. Malo. This provincial park is removed and will not be affected by the final preferred route.

The final preferred route does not cross through or affect any WMAs. No negative effects are anticipated.

Crown Lands and Conservation Lands

The final preferred route crosses two parcels of Crown land south along the Red River Floodway. These Crown land parcels are under lease for agricultural purposes for cropping and forage. No conservation lands are directly affected by the final preferred route though the line crosses through two conservation districts (La Salle-Redboine and Seine-Rat River). Manitoba Hydro will notify affected Crown land lease holders with respect to construction and subsequent operation and maintenance schedules to minimize disruption. No negative effects from construction and operation of the 230 kV transmission line are anticipated.

9.14.5.1.2 Mitigation

To mitigate effects on recreation land use and tourism, applicable legislation, regulations and guidelines will be adhered to, and Project-specific mitigation measures will be outlined in the construction EnvPP. Measures to mitigate or minimize the effects of Project-related effects include the following:

- Discussions will be held with Manitoba Conservation Parks and Natural Areas Branch representatives to confirm and provide Manitoba Hydro with the permanent right to access, use and maintain the transmission line ROW across Duff Roblin Heritage Park, subject to a Manitoba Hydro easement and the applicable “Access” land use category as noted under the System Plan for Manitoba Parks for the heritage park.
- Subject to detailed engineering analysis, tower location (tower “spotting”) will be used, where feasible, to reduce adverse effects.
- Recreational resource users, including Crown land encumbrance holders, and snowmobile associations will be notified in advance as to the schedule for clearing and construction.
- Information signs and the placement of warning markers will be used to identify the ROW, to the extent feasible where it intersects a recreational trail.
- Construction activities will be conducted to prevent any unnecessary damage outside the required rights-of-way to protect the natural landscape surrounding work activity sites and other disturbed/developed areas.
- If site-specific issues of concern arise, mitigation may be possible through, for example, maintaining a buffer of trees between a site/trail and the transmission line ROW.
- Existing access routes should be utilized and machinery will not operate outside of the ROW.
- Prior to construction activities, resource users, such as trappers, and private woodlot owners will be notified as to the scheduling for construction activities.
- Locations of private managed woodlots will be identified in the construction EnvPP for the line to avoid damage from construction activities (e.g., errant construction equipment).

9.14.5.1.3 Operation and Maintenance Effects

Station Modifications

As modifications to both the St. Vital and La Verendrye stations will occur within existing fenced station sites, there will be no expected Project-related effects on non-agricultural land use. The stations will continue to operate as they currently do.

230-kV Transmission Lines

Recreation and Tourism

After construction, Project related activity levels will decrease substantially. Most direct effects on non-agricultural land use will have already occurred or been avoided or addressed through the planning and other mitigation measures implemented prior to and during Project construction.

With the exception of periods where routine maintenance and vegetation management occurs, resource harvesting and recreational activities (e.g., hunting, angling and bird watching) will be able to continue uninterrupted in or near the Project throughout its operating life. These disturbances will only occur infrequently, be small in scale and short term duration and will therefore limit the potential for interactions or likely effects to occur.

The water courses crossed by the final preferred line are fished recreationally. As with construction, the potential effects on sport fishing as a result of operation of the line are similar. Potential effects on habitat and water quality will be negligible with mitigation implemented at watercourse crossings. Increased access can lead to an increase in fish harvest from water bodies along the transmission line. The line follows, or is in close proximity to existing linear facilities through much of its length and therefore access to water bodies will not be increased. Existing sport fishing regulations are in place to address any changes in fishing pressure as a result of the Project.

Though the Project ROW will not be accessible to automobile traffic, it has the potential to be used as a recreational trail for ATVs and snowmobiles. While Manitoba Hydro does not promote the use of its transmission line ROWs for these purposes, it has been noted through public consultation and stakeholder meetings that such access may have an overall positive effect on some land and resource users and may even provide better access to certain areas. Representatives from TransCanada Trail Association and SnoMAN (Snowmobilers of Manitoba) indicated the beneficial aspects of co-locating their trails with the ROW (AECOM 2013).

Navigation

The Project crosses the Red River, a “Scheduled Water” under the *NPA,* at two locations: one location east of Letellier and one location near the City of Winnipeg south city limit. Manitoba Hydro will adhere to the applicable CSA stream crossing clearance guidelines for operation and maintenance of the transmission line at waterbodies and as such believes that there will be no effect to navigation.

Protected Areas, Parks and Conservation Lands

No adverse effects are anticipated from the operation and maintenance of the Project (e.g., herbicide use) on protected areas, provincial parks and conservation lands (i.e., provincial forests, wildlife management areas). The exception to the above is Duff Roblin Heritage Park. The ROW crossing through this area is subject to a Manitoba Hydro easement and an “Access” land use category established for the heritage park to accommodate future hydro transmission lines. During the operational phase anticipated effects on the heritage park is considered low, limited to the Project ROW, and medium-term in duration.

Aboriginal Lands and Interests

The final preferred route does not cross any Reserve Lands or Federal lands. No effects are anticipated on Aboriginal Lands (Reserve Lands and TLEs) from the operation and maintenance of the transmission lines. The operation of the transmission lines has the potential to increase the disturbance to wildlife/game populations along the ROW in some areas due to improved access and negatively affect plants valued by Aboriginal people from the use of equipment as well as herbicides to control undesirable plant species. Anticipated adverse effects on Aboriginal resource harvesting and gathering activity from annual operation and maintenance activities in any one area are considered low, local and limited in aerial extent and medium-term in duration.

9.14.5.1.4 Mitigation

Operations have less potential for disturbance to recreation land use than construction activities. The most effect on recreation during the operations phase is the permanent physical presence of the line would potentially have the greatest effect on redcreation during operation. The line will be a net addition to the landscape and any adverse effect will be incremental in nature, particularly in areas where other infrastructure facilities are present. Adherence to measures outlined in the Project-specific EnvPP for operations will tend to protect the same environmental qualities that are valued for outdoor recreation purposes. Measures to mitigate or minimize Project-related effects include the following:

- Work permits from Manitoba Conservation will be obtained for all project activities occurring on provincial Crown lands.
- Prior to operation and maintenance activities, the snowmobile associations will be notified of the proposed work schedules.
- Existing access roads and trails will be used to the extent possible.
- Information signs and the placement of warning markers will be used to identify the ROW where it intersects with a recreational trail.
- Operation and maintenance activities will be undertaken in a manner to prevent unnecessary damage outside of the required ROW to protect the natural landscape surrounding work activities.
- During operations, Manitoba Hydro will follow-up with individual woodlot owners to address any remaining Project-related concerns.
- Manitoba Hydro will work with individual communities and resource users regarding ways to reduce pressure on the resource base caused by operations.

9.14.6 Cumulative Environmental Effects on Non-Agricultural Land Use

The potential environmental effects for this VC are well understood and can be managed to acceptable levels through General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). A cumulative effects assessment on the effects of this project in combination with other past, current and future projects is not warranted, as the project contribution to total cumulative effects is anticipated to be negligible.

9.14.7 Follow-up and Monitoring

Land and resource use activities within the RAA are the subject of ongoing planning, management, regulatory enforcement and monitoring by the federal, provincial and municipal governments. This includes monitoring and the collection of information and statistics on, for example, municipal land use, hunting and angling activity and development for the purpose of licensing, enforcement and resource management. Manitoba Hydro has provided and will continue to provide Project information to relevant agencies and organizations as required and requested.

9.14.8 Summary

The prevalence of privately-owned agricultural land within the RAA limits the readily-available land base for resource harvesters and recreational users. However, where opportunities for such activities exist, proper routing, pre-planning and the implementation of the mitigation measures described above, the effects of the Project on non-agricultural land use are anticipated to be minimal.

9.15 COMMUNITIES

The key questions addressed in the communities VC are whether and how the proposed Project will affect the communities in which people live, and the lives of people in those communities that comprise the RAA (Map 9-6).

Strong and healthy communities are reflected in the well-being of their residents, the availability and quality of physical and social infrastructure and services, and the characteristics of their local economies. For the purposes of this environmental assessment, the communities' VC focuses on aesthetics, public safety and human health and well-being. The infrastructure and services VC was discussed separately in Section 9.10 while potential economic benefits and effects that may occur as a result of the Project are discussed in the employment and economy VC in Section 9.11.

The Project may directly affect communities where it leads to changes in the nature and quality of aesthetics, and / or where it causes changes in the health and well-being of community members.

9.15.1 Scope of Assessment for Communities

9.15.1.1 Regulatory Setting

The scope of the assessment for communities is based on the requirements for applications under s.11 of the *Manitoba Environment Act*. Specifically, the assessment was prepared to meet the filing requirements and guidance for socio-economic effects.

Manitoba Conservation and Water Stewardship EA guidelines provide for the inclusion of the potential human health effects of proposed developments.

9.15.1.2 Boundaries

The temporal boundary of the assessment for communities encompasses the Project's construction phase, as well as the operation and maintenance phase; see Section 3.7 for the Project construction schedule. Operation and maintenance of the Project will begin following construction and will be carried out until project decommissioning.

The spatial boundary of the assessment for communities is primarily the LAA. The LAA for communities is defined as those municipal jurisdictions that are traversed by the Project. The RAA is defined similarly as the LAA for the Project.

The communities' VC is broad, and thus not subject to specific administrative boundaries. The technical boundaries for the assessment of communities were primarily based on public and stakeholder consultations and mapping identification data.

9.15.1.3 Identified Issues and Concerns

Concerns regarding the environmental effects of the Project on communities were identified during the PEP. Potential issues and questions associated with the potential effects of the Project on communities were primarily associated with aesthetics, public safety and human health.

Specific comments included the following issues and concerns:

- Concerns regarding the aesthetics of towers close to rural residential development.
- Health concerns primarily related to Electric and Magnetic Fields (EMF) issues.

9.15.2 Project Interactions with Communities

Table 9.15-1 lists each Project activity and physical work for the Project, and ranks each interaction as 0, 1, or 2 based on the level of interaction each activity or physical work will have with communities.

Table 9.15-1: Project Interactions with Communities

Project Activities and Physical Works	Potential Environmental Effect		
	Change in Viewshed (Aesthetics)	Change in Public Health and Safety	Change in EMF
Construction:			
Clearing	1	1	0
Drilling	0	1	0
Marshalling Yards	0	1	0
Tower Installation	1	1	0
Stringing Conductors	1	1	0
Presence of Materials and Equipment	0	1	0
Site Reclamation	0	1	0
Operation and Maintenance:			
Project Presence	2	0	1
Maintenance of Infrastructure	0	1	0
Vegetation Management	0	0	0

KEY:

Project-related Environmental Effects were ranked as follows:

0 = No interaction.

1 = Interaction may occur; however, based on past experience and professional judgment, the resulting environmental effect is well understood and can be managed to acceptable levels through General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). No determination of significance of residual effects or cumulative effects assessment is warranted.

2 = Interaction may occur, and the resulting environmental effect may exceed acceptable levels without implementation of project-specific mitigation. Further assessment is warranted.

9.15.2.1 Justification and Rationale for Interactions Ranked as 1

With public health and safety, there is potential for adverse effects from construction. However, Project environmental effects from construction on public health and safety can be managed and mitigated to acceptable levels using the general mitigation measures outlined in Chapter 10.

As such, the Project is not expected to have adverse effects on change in public health and safety. Activities are ranked as 1 during construction and as such no detailed effects assessment is presented. All activities related to change in EMF were rated as 0, meaning no interaction, for construction or 1 during operation and maintenance and no detailed effects assessment is presented. The Project is not anticipated to have an adverse effect on change in EMF.

9.15.2.2 Selection of Environmental Effects and Measurable Parameters

The environmental assessment of communities is focused on the following environmental effects:

- Change in viewshed (aesthetics)

In this section, the environmental effects of project activities on viewshed, including cumulative effects will be assessed.

Table 9.15-2 provides the measurable parameters used for the assessment of the selected environmental effect, and the rationale for selection.

Table 9.15-2: Measurable Parameters for Communities

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Change in viewshed (Aesthetics)	Visibility of the towers and conductors, and contrast with the landscape	• To highlight positive or negative visual effects of the transmission towers. • Noted as a concern by participants in the Public Engagement Process

The selection of measurable parameters in Table 9.15-2 was based on the professional judgment of the Study Team and the results of the PEP.

9.15.3 Residual Environmental Effects Description Criteria

Parameters listed in Table 9.15-3 below are used to characterize and evaluate residual environmental effects of the Project on communities.

Table 9.15-3: Characterization of Residual Environmental Effects for Communities		
Characterization	**Description**	**Quantitative Measure or Definition of Qualitative Categories**
Direction	The ultimate long-term trend of the environmental effect	**Positive** – an improvement in general aesthetics
		Adverse – a decrease in general aesthetics
		Neutral – no net change in the general aesthetics
Magnitude	The amount of change in a measurable parameter or variable relative to baseline case	**Negligible** – no measurable change in general aesthetics
		Low – a minor measureable change in general aesthetics
		Moderate – a measurable change in general aesthetics but less than high
		High – a substantial measurable change general aesthetics
Geographical Extent	The geographic area in which an environmental, economic, social, heritage, or health effect of a defined magnitude occurs	**PDA** – effects are restricted to the PDA
		LAA – effects extend into the LAA
		RAA – RAA same as LAA
Duration	The period of time required until the VC returns to its baseline condition, or the effect can no longer be measured or otherwise perceived	**Short-term** – effects restricted to the construction phase
		Medium-term – effects extend through the operation phase
		Long-term – effects extend beyond the decommissioning phase
		Permanent – measurable parameter unlikely to recover to baseline
Frequency	The number of times during the Project or specific Project phase that an environmental effect may occur	**Occasionally** – once per month or less
		Sporadic – once per week
		Regular – more than once per week intervals
		Continuous – regularly throughout the life cycle of the Project

Table 9.15-3: Characterization of Residual Environmental Effects for Communities

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Socio-economic Context	The resilience or ability of an environment to accommodate change.	**Low** – environment less able to accommodate change
		Moderate – well developed and functioning systems in place that are able to accommodate some change
		High – well developed and functioning systems able to accommodate changes
Likelihood of Significant Effect	The likelihood that a significant effect will occur if the assessment has made a conclusion of significance for a VC	**Low** – a low probability of the significant effect occurring
		Medium – a medium probability of the significant effect occurring
		High – a high probabilityof the significant effect occurring

9.15.3.1 Significance Thresholds for Residual Environmental Effects

The EA methodology for communities is based on the determination of whether significant adverse residual environmental effects are likely to occur from the Project.

A significant residual adverse environmental effect on communities is one where Project infrastructure and / or activities dominates the visual landscape of an area in such a way that it causes an unacceptable change in the overall aesthetic character, quality, value and use of that location for the overall population.

9.15.4 Existing Conditions for Communities

9.15.4.1 Baseline Data Sources

The environmental effects analysis uses the approach commonly adopted for the socioeconomic assessments of other projects. Relatively precise predictions of certain interactions arising from the Project, such as noise (see Section 9.12.5.5) and EMF (see Section 9.12.5.6), can be made through specific modelling techniques. For other potential social effects, the collection of baseline data was limited to statistical information and information from publicly available websites. Existing conditions were described in the preparation of the baseline.

9.15.4.2 Baseline Overview

9.15.4.2.1 Communities

The RAA consists of the various municipalities (see Section 9.10.1.2) traversed by the Project. The total population of the RAA is approximately 220,813 (the City of Winnipeg 2006a–2006b; Statistics Canada 2013a–2013k). The majority of residents of the RAA live in the southern portion of the City of Winnipeg in the neighborhood communities of Fort Garry (68,095) (the City of Winnipeg 2006a), St. Boniface (49,150) , including the residential area of Sage Creek, and St. Vital (61,650) (the City of Winnipeg 2006b). The remainder of the population of the RAA are scattered throughout the various RMs (42,595), the town of Niverville (3,540) and the village of St. Pierre Jolys (1,099).

9.15.4.2.2 Aesthetics

The aesthetics of the Project RAA vary with the topography and vegetation of the natural landscape, as well as the degree of human activity associated with settlement patterns and with consumptive and non-consumptive land/resource uses beyond communities. Manitoba's regions outside of Winnipeg encompassed within the RAA include the Pembina Valley Region and Eastern Region.

The Pembina Valley Region stretches from the Red River west to the Manitoba Escarpment and from Highway 2 south to the US border, an area rich in farmland and pioneering history. The Eastern Region transitions from farmland into boreal forest and presents opportunities for agri-tourism, eco-tourism, canoeing, fishing and hunting. The culture in the area is as varied as the landscape with a rich history. For portions of these two regions that fall within the RAA, agriculture is the major industry. Farmers grow a wide range of crops and livestock production is also prominent.

The land within the Project RAA consists primarily of agricultural properties interspersed with rural residences. Suburban residential development is evident in the City of Winnipeg (e.g., Sage Creek). The land is predominantly flat with some tree cover. Woodland cover is sparse with occasional small woodlots and shrub patches as well as planted hedgerows and shelter belts. Hedge rows and shelter belts are typically found around farms and rural residential properties. Areas of mixed woodland are also present in the area WMAs and around St. Malo Provincial Park. Ribbons of tree cover also follow along the major rivers and creeks flowing through the RAA. The rural landscape pattern is predominantly defined by section and mile roads as well as river lot survey properties corresponding to land holdings. Major visible infrastructure includes major highways and roads, railway lines, hydro transmission and other distribution lines running across the landscape. Other types of infrastructure facilities visible across the rural landscape include station sites, communication towers and wind turbines.

9.15.5 Project Environmental Effects on Communities

Only the interactions ranked as 2 in Table 9.15-1 are considered further with respect to Project and cumulative effects and determination of significance in the assessment of Project-related environmental effects.

9.15.5.1 Assessment of Change in Viewshed (Aesthetics)

The aesthetic value of the landscape can vary according to its scenic elements and the perception of the landscape by viewers. Landscapes have scenic value, which may be altered by changes brought on by the Project and other future developments.

9.15.5.1.1 Construction Effects

During construction, crews will move along the transmission line ROW completing each component / activity sequentially. Construction activities include: clearing the ROW (i.e., removal of vegetation), establishing marshalling yards, drilling foundations, installing towers, stringing conductors and construction site rehabilitation and decommissioning. These activities are expected to result in disturbance to the existing visual landscape by their presence.

Project components will become more visible to varying and different degrees from one location to the next as construction progresses from clearing for the ROW, to tower installation and stringing conductors. The effects of the Project on aesthetics recognizes that there will be increasing levels of alteration to viewsheds from the visibility of the towers and conductors and contrast with the landscape during Project construction, but focuses on the final alteration (i.e., during operations and maintenance) when all Project components are constructed and operational.

During the PEP, comments were raised by the public with respect to transmission tower aesthetics. Manitoba Hydro indicated that the towers will be placed adjacent to existing towers within the existing ROW along the Southern Loop corridor, and have similar spacing and heights wherever possible. In some cases, however, in order to meet industry standards for the towers this may not be possible.

Modifications to St. Vital, Letellier, and La Verendrye stations will occur within existing fenced areas. As such, there will be no expected Project-related effects on aesthetics.

Manitoba Hydro will continue to work with a range of stakeholders (local residents, interests groups, and provincial government agencies as applicable) in development of the proposed transmission lines, including tower placement within the ROW, and scheduling of construction activities with the goal to reduce any potential visual or other interactions.

The presence of short-term and intermittent construction activities during this phase of the Project is unlikely to affect aesthetics, except where the ROW or workspace is visible. However, the towers will be visible, once they are erected, from locations outside the ROW.

9.15.5.1.2 Mitigation

Measures to mitigate or minimize project-related effects related to construction include the following:

- Subject to detailed engineering analysis, tower location (tower "spotting") can be utilized to reduce aesthetic effects in sensitive land uses in proximity to the ROW such as river crossings.
- Right-of-way boundaries and sensitive areas will be identified and clearly marked prior to clearing.
- Mud, dust and vehicle emissions will be managed in an appropriate manner to minimize disturbance.
- Disturbance to adjacent public green spaces or natural areas will be minimized.
- Retain a vegetative buffer screen at watercourse crossings to the extent practical.

9.15.5.1.3 Operation and Maintenance Effects

In terms of aesthetic effects, the presence of the Project will be continuously evident and is the focus of this assessment.

The presence of a transmission line can influence the visual landscape in urban and rural settings, as well as other sensitive settings. Aesthetics do, to a certain extent, differ according to a person's values and perspectives. An individual's response to visual changes in the landscape and the level of the concern or sensitivity related to a particular viewscape is a function of the type of views involved, as well as the distance, perspective and duration of the view. Aesthetics will depend on:

- The physical relationship of the viewer to the transmission line (distance and site line)
- The activity of the viewer (e.g., living in the area, driving through or sightseeing)
- The contrast between the transmission line and the surrounding environment.

The RAA consists predominantly of flat, agricultural terrain that is fairly common and similar to adjacent areas, and includes other linear infrastructure developments that have altered the original landscape. Concerns were expressed by the public on aesthetic quality or effects on aesthetics from transmission line development (i.e., towers in close proximity to rural residential development) during the PEP, particularly in the Sage Creek area within the City of Winnipeg.

Operations and maintenance activities include infrastructure maintenance and vegetation management. These activities will not be readily evident at any particular time as they are intermittent and would not involve a large workforce.

The route selection process for the Project sought to avoid site-specific issues such as residences, Aboriginal Reserve Lands, communities, parks, and recreational sites. Where route selection was not a consideration for the Project, existing Manitoba Hydro owned ROW was used. Although transmission lines are considered essentially permanent features on the landscape, application of routing and mitigation measures can reduce potential effects on visual quality. Mitigation measures can include structure placement and visual screenings. The latter can include leaving buffers at sensitive sites such as river and stream crossings.

In a number of areas, the final preferred route also parallels existing linear infrastructure (i.e., highways, roads, drains), including: through the City of Winnipeg on the south side of the Floodway channel for 7.2 km (approx.); along PTH 59 at two locations for 1.7 km (approx.); south of PR 210 for 886 m (approx.); along the south side of PTH 52 for 456 m (approx.); and west of PTH 75 for 1.9 km (approx.). Parallel opportunities also occur with several existing transmission lines, including: south of La Verendrye Station for 5.7 km (approx.); south of St. Vital Station across the Floodway to a point east of PTH 59 in the RM of Ritchot for 6.9 km (approx.); and north to Letellier Station for 2.1 km (approx.) west of PTH 75. In these areas, the line is a net addition to the landscape.

From La Verendrye Station south and east to the City of Winnipeg and along the Floodway, new lattice steel towers will be utilized within the existing Southern Loop corridor. South of La Verendrye Station to the point where the ROW turns east, a lower profile steel lattice tower will be used for the new 230-kV line. The new transmission line will be a net addition to the visual landscape in this section. In the portion of the ROW east to the city and along the Floodway, a lower profile steel lattice tower will be used for the new 230-kV line. As there are no existing lines within this part of the ROW, the towers will be a new addition to the visual landscape.

Where routed in the existing Manitoba Hydro owned ROW through Sage Creek, the new transmission line will be located on larger double-circuit steel tower on the east side within the existing ROW for a distance of approximately 1.6 km (i.e., placed 49 m (approx.) in from the ROW edge) and will be placed to match the existing footprint of the transmission line towers already in the ROW. In this area, given the proposed height of the structure, the new transmission line will be a net addition to the visual landscape. Outside the existing developed portion of Sage Creek to the north and south, there will be two 230-kV transmission lines on separate lattice steel towers situated along the east side of the existing ROW. These lower profile towers will also be placed to match the existing footprint of the transmission line towers in the ROW.

Viewed from major thoroughfares in the LAA and PDA that are crossed by the new transmission line, the Project would be more visible across the landscape. The scale of this presence would be moderated somewhat with the use of lower profile (19 to 27 m high) H-frame structures where they are routed through agricultural land south of the City of Winnipeg to Letellier Station. In those areas where other existing linear infrastructure is already present, the change in the character of the landscape will be incremental in nature. In other areas, particularly where there is an absence of other linear infrastructure, the Project will be a new addition to the visual landscape. The nature of the effect would be largely subjective, due to the varying public perceptions with respect to the visual environment.

The 230-kV line will have an aesthetic impact on a number of residences located at varying distances from the line once operational. Without considering dwelling orientation, shelterbelt screening and other location factors, it is generally acknowledged that the closer one is to a line, the more visible it would be.

For the Southern Loop corridor between La Verendrye Station and where the final preferred route joins with the route south of St. Vital Station in the RM of Ritchot, there are no residences located within 75 m from the ROW edge. Another 28 residences are located 75 to 250 m from the ROW edge. The portion of the final preferred route from St. Vital Station south through the City of Winnipeg and Sage Creek to Letellier Station has a total of 94 residences located within 75 m of the transmission line. An additional 207 residences are located from 75 m to 250 m of the transmission line ROW.

As modifications to both the St. Vital and La Verendrye stations will occur within existing fenced station sites, there will be no expected Project-related effects on aesthetics. The stations will continue to operate as they currently do.

9.15.5.1.4 Mitigation

Subject to detailed engineering analysis, tower location (tower "spotting") has been identified as a potential mitigative measure to reduce adverse effects on sensitive land uses in proximity to the ROW. Location preferences identified in the course of the land acquisition process (including more detailed pre-construction evaluation of the selected rights-of-way) will be included in the engineering analysis and, where technically and economically feasible, incorporated in the structure placement decision. Manitoba Hydro Property Department staff will discuss site-specific circumstances or tower placement preferences with landowners.

9.15.5.1.5 Characterization of Residual Change in Viewshed (Aesthetics)

A summary of the environmental effects assessment and prediction of residual environmental effects resulting from interactions with aesthetics that were ranked as 2 in Table 9.15-1 is provided in Table 9.15-4 below. Activities with the potential to result in substantive residual environmental effects are Project presence.

The likely residual effects of Project operations and maintenance on aesthetics are as follows:

- **Direction:**
  - **Adverse** as the Project presence may lessen people's visual enjoyment of the landscape.

- **Magnitude:**
  - The Project impact on aesthetics is subjective and dependent upon perception and individual opinion. Overall, as the majority of the Project is routed through previously modified agricultural land and utilizes existing ROW in one area that pre-dates residential development, the magnitude of effects is anticipated to be **low to moderate**.
- **Geographic Extent:**
  - Project effects on aesthetics will be confined to within the **LAA** as the Project is not anticipated to be visible outside of this spatial boundary.
- **Duration/Frequency:**
  - Project effects on aesthetics will be **long-term** while the frequency of visual effects will be **continuous** over the life of the Project.
- **Socio-economic Context:**
  - Project effects will occur in an area of **moderate** resilience.

9.15.5.2 Assessment of Change in Public Health and Safety

Only interactions ranked as 2 in Table 9.15-1 were considered further in the assessment of potential residual Project environmental effects. With the implementation of the mitigation measures, Project environmental effects on public health and safety can be managed to acceptable levels. As such, no determination of significance is made; however, a discussion of potential environmental effects follows.

9.15.5.2.1 Construction Effects

Accidents or other unplanned events are possible during the construction of any project and may affect general public safety and thereby place additional demands on local safety and security services including fire, emergency response and policing (see Section 9.10). The types of community and regional services that could be called upon in the event of an accident or unplanned events include forest fire, emergency response, medical and policing services.

During construction, a number of potential, though unlikely, accidents and / or incidents may occur of which the following are the most likely to have community-related implications, including: collisions, spills and leaks of hazardous materials, fire and noise, vibration and dust generation. Noise generated during construction activities will typically fall within acceptable provincial noise level guidelines. Other disturbances occurring in the vicinity will be intermittent and short-term in duration. As modifications to both the St. Vital and La Verendrye stations will occur within existing fenced station sites, construction site risks to public safety and health are expected to be minimal.

The operation of vehicles and heavy equipment on provincial highways, and the ROW could result in human collision mortality or injury. Human incidents may involve vehicle-vehicle collisions or vehicle-pedestrian collisions. During construction, the potential for these types of collisions is primarily influenced by traffic volumes. The public will be made aware of construction activities though advertisements in local papers and through the provision of appropriate signage. Standard safety procedures, designated truck routes and signage will also be in place to mitigate potential effects of Project traffic.

During Project construction environmentally hazardous materials such as petroleum hydrocarbons (e.g., gasoline, diesel and lubricating oils) and hydraulic fluid will be used. As part of its standard construction procedures, Manitoba Hydro strives to reduce the potential for leaks and spills through the implementation of appropriate management systems. Spills or leaks of petroleum hydrocarbons could occur along the ROW, as a result of incidents involving heavy equipment, vehicles that contain fuel, oil and lubricants (e.g., excavators and cranes).

During Project construction, the ROW will be considered an active construction site. Therefore, access will be limited to only those individuals required to be there and not members of the general public. Standard workplace health and safety measures, including appropriate signage will be applied to work sites.

There is also potential for fires during the construction phase. Manitoba Hydro maintains procedures that will include a plan for preventing and combating fires. A fire prevention plan will be implemented and adhered to by Manitoba Hydro and its contractors consisting of fire prevention measures and incident response procedures to address public safety.

During construction of the transmission line, activities can result in elevated levels of noise and other disturbances (i.e., vibration and dust), including the use of implosives to splice conductors. Noise and other disturbances generated will be temporary and intermittent for the construction phase.

No adverse effects on the public safety and health of local populations are anticipated as a result of the Project. Manitoba Hydro will address any issues or concerns related to public safety during construction as they arise.

9.15.5.2.2 Mitigation

Mitigation measures to address public health and safety include:

- All equipment will be fitted with standard mufflers and silencers, and kept in good working condition.
- Limit noise and vibration causing activities to daytime working hours in developed areas and comply with all applicable municipal by-laws.
- Only water and approved dust suppression products will be used to control dust.
- Provide appropriate notice prior to use of implosives in residential areas.

- Restrict use of implosives to normal working hours only.

9.15.5.3 Assessment of Change in EMFs

Only interactions ranked as 2 in Table 9.15-1 were considered further in the assessment of potential residual Project environmental effects. With the implementation of mitigation measures, Project environmental effects related to EMFs can be managed to acceptable levels. As such, no determination of significance is made; however, a discussion of potential environmental effects follows.

9.15.5.3.1 Operations and Maintenance Effects

A number of Project components, including the transmission lines and existing stations will produce EMFs. EMFs are invisible lines of force surrounding any wire carrying electricity and are produced by electric tools, appliances, household wiring and transmission lines. Transmission lines produce an electric field, a magnetic field and corona. Corona and electric fields can cause electrical effects. EMFs are strongest near the source, and the strength of the field diminishes rapidly with distance (Health Canada 2010, internet site). Magnetic fields are more pervasive and have been the focus of health research.

During the PEP, including the Aboriginal engagement process, comments were received from the public with respect to the perceived health effects due to EMFs.

In Canada, the Federal Provincial Territorial Radiation Protection Committee (FPTRPC) has established a Working Group to carry out periodic reviews, recommend appropriate actions and provide position statements that reflect the common opinion of intergovernmental authorities on EMFs. The FPTRPC concluded that “there is insufficient scientific evidence showing exposure to EMFs from power lines can cause adverse health effects such as cancer” (http://www.hc-sc.gc.ca/ewh-semt/radiation/fptradprotect/emf-cem-eng.php). In addition, the Manitoba Clean Environment Commission developed a Health and EMF Expert’s Consensus Statement on the Human Health Effects of EMF in 2001 which concluded that “The weight of scientific evidence does not support the conclusion that extremely low frequency EMFs such as those produced by power lines are a cause of adverse effects on human health.” (http://www.cecmanitoba.ca/resource/reports/Commissioned-Reports-2000-2001-Electirc_Magnetic_Fields_Health_EMF.pdf).

Detailed scientific assessments by the World Health Organization, the National Cancer Institute (US) and other health agencies have found that the epidemiological research, which notes a correlation between EMF and childhood leukemia, does not provide a reliable scientific basis (with evidence of causality) to conclude that exposure to EMF below the science-based international exposure guidelines can cause or contribute to any adverse health effects.

Predicted EMF Levels for the Sage Creek 230 kV Transmission Line

Electric fields from transmission lines are generally measured in kilovolts per metre (kV / m), while magnetic fields are generally measured in milliguass (mG).

There are currently no Canadian regulations regarding EMF emissions; however, EMF associated with Manitoba Hydro high voltage transmission lines are well within human safety limits as a result of implementing proper design. Exposure guidelines for human health and magnetic fields are set by international agencies as set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The set ICNIRP recommended limit is 2,000 mG.

In response to community concerns expressed during the PEP, EMFs have been predicted for operation of the 230-kV transmission line through Sage Creek. Predicted peak magnetic field levels for a 230-kV transmission line (1 m above ground) would be 220 mG within the ROW. In comparison, peak magnetic field levels would be 60 mG for a 230-kV transmission line (1 m above ground) at a fence line.

As noted in Figure 9.15-1, the anticipated peak magnetic field levels found on the Sage Creek ROW with presence of an existing 115 kV transmission line and the addition of two 230-kV transmission lines are substantially below the ICNIRP guideline, both within and at the edge of the ROW.

Manitoba Hydro remains sensitive to public concerns regarding potential health effects and EMFs and will continue to undertake the following actions regarding the issue:

- Monitoring of worldwide research programs on electric and magnetic fields.
- Participation in, and support of, on-going health and safety research on the local, national and international levels.
- Maintenance of active communications and provision of technical information to interested parties, including the public and agencies responsible for public and occupational health and the environment.

Manitoba Hydro will continue to have discussions with area residents and provide information to the public on request as the Project progresses.

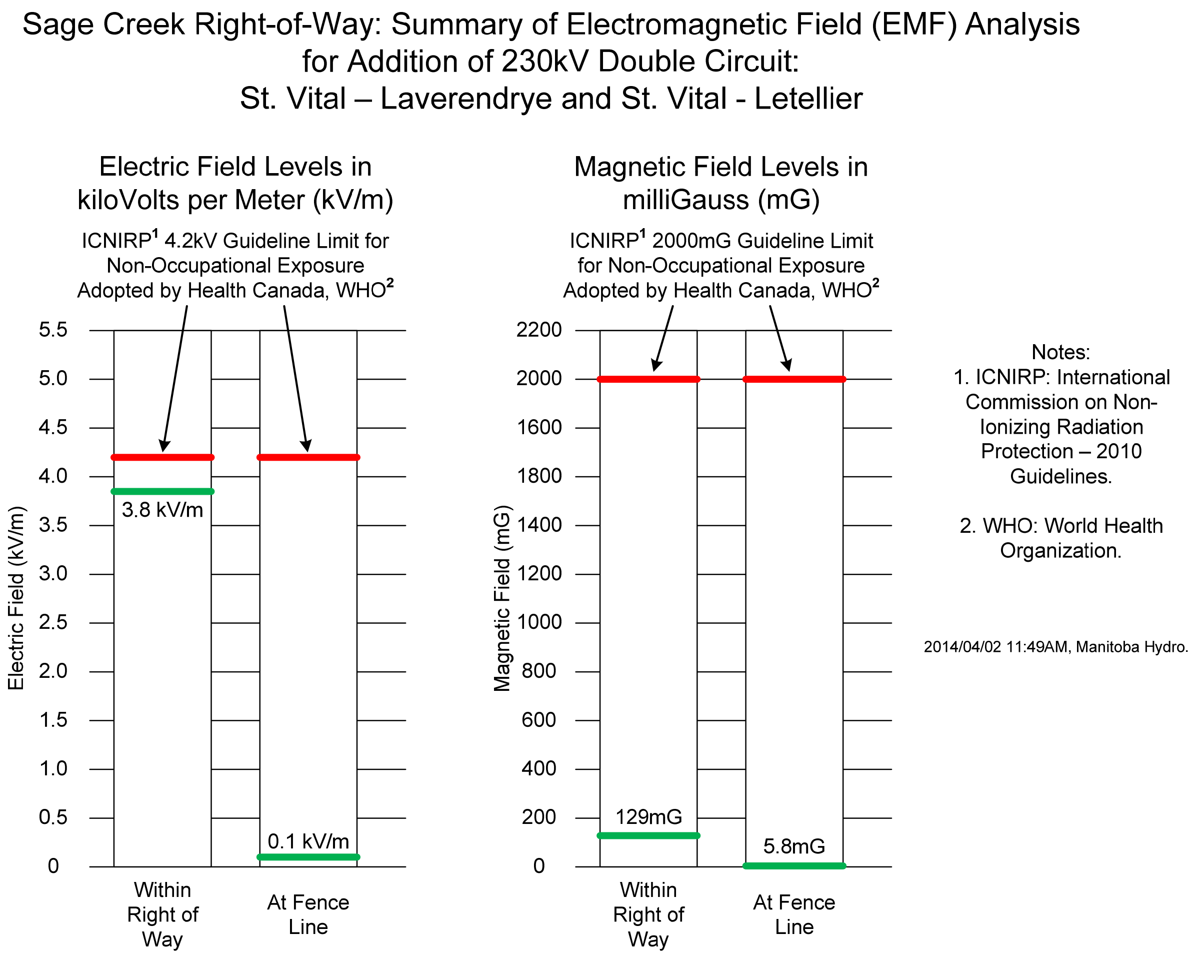


Figure 9.15-1: Sage Creek ROW EMF – Peak Electric and Magnetic Fields Levels with the Addition of Two 230-kV Circuits

9.15.5.4 Summary of Project Residual Environmental Effects on Communities

The combined residual environmental effects on communities with respect to aesthetics are anticipated to be adverse and not significant (Table 9.15-4).

Table 9.15-4: Summary of Project Residual Environmental Effects on Communities

Potential Residual Environmental Effects for Project Activities and Physical Works	Proposed Mitigation/Compensation Measures	Residual Environmental Effects Characteristics							Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Socio-economic Context	Significance	Likelihood of Significant Effects	
Change in viewshed (Aesthetics)									
Operation and Maintenance – Project Presence	• Tower spotting and routing to avoid sensitive receptors. • Maintaining vegetation screens at sensitive sites	A	L/M	L	LT/C	M	N	N/A	None

KEY: (refer to Table 9.10-3 for definitions on the terms referred to below:

Direction: P: positive; N: neutral; A: adverse

Magnitude: N: Negligible – no measurable change to overall aesthetics; L: Low – a minor measurable change to overall aesthetics; M: Moderate – a measurable change to overall aesthetics but less than high; H: High – a substantial measurable change to overall aesthetics.

Geographic Extent: PDA: Site-specific within the Project development area; L: Local: within the LAA; R: within the RAA.

Duration: ST: Short term; MT: Medium Term; LT: Long Term; P: Permanent – will not change back to original condition.

Frequency: O: Occasionally, once per month or less; S: Sporadic, once per week; R: Regular, more than once per week intervals; C: Continuous, regularly throughout the life cycle of the Project.

Socioeconomic Context: L: Low, M: Moderate, H, High

Significance: S: Significant; N: Not Significant.

Likelihood of Significant Effects: based on literature review and professional judgment. N/A: Not Applicable; L: Low; M: Medium: H: High

9.15.5.5 Determination of Significance of Residual Environmental Effects

A significant effect of the Project on aesthetics is one where the presence of Project infrastructure and / or activities dominates the visual landscape of an area in such a way that it causes an unacceptable change in the overall aesthetic character, quality, value and use of that location for the overall population. An environmental effect that does not meet these criteria is not significant.

Perceptions related to the effect of the Project on a particular landscape view are subjective and dependent on the opinions of individuals. Manitoba Hydro has considered visually sensitive areas during the initial planning phases of the Project where possible (e.g., avoidance of provincial parks) and the use of existing corridors (e.g., the Southern Loop corridor and the existing Manitoba Hydro owned ROW through Sage Creek) to limit the effects on the visual aesthetics of the lands crossed.

It is predicted, that the presence of Project infrastructure and / or activities will not dominate the visual landscape of any area in such a way that it causes an unacceptable change in the overall aesthetic, character, quality, value and use of that location for the overall population. Therefore, the Project effects on aesthetics are rated as not significant.

9.15.6 Cumulative Environmental Effects on Communities

This section evaluates the effects of the Project on aesthetics in combination with the effects of other projects or activities that will likely overlap spatially and temporally with those of the Project.

Projects will have an interaction ranked as 0 if Project environmental effects do not act cumulatively with those of other projects and activities. Interactions ranked as 1 are Project environmental effects that act cumulatively with those of other projects and activities, but are unlikely to result in significant cumulative environmental effects or will not measurably change the state of aesthetics. Interactions ranked as 2 are those situations where Project environmental effects act cumulatively with those of other projects and activities, and could potentially result in significant cumulative environmental effects or at least a measurable change in aesthetics.

The potential for interaction between the effects of the Project on Communities and the effects of other identified past, current and future projects are presented in Table 9.15-5.

Table 9.15-5: Potential Cumulative Environmental Effects on Communities

Other Projects and Activities with Potential for Cumulative Environmental Effects	Potential Cumulative Environmental Effect
Infrastructure Projects	1
Residential Projects	1
Energy Projects	2

KEY:

Cumulative environmental effects were ranked as follows:

0 = Project environmental effects do not act cumulatively with those of other projects and activities.

1 = Project environmental effects act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of beneficial management or codified practices.

2 = Project environmental effects act cumulatively with those of other projects and activities and the resulting cumulative effects may exceed acceptable levels without implementation of project-specific or regional mitigation.

9.15.6.1 Assessment of Cumulative Environmental Effects on Communities

9.15.6.1.1 Infrastructure Projects

The twinning of PTH 59 and PTH 52 is planned for construction in the future and will traverse the Project route. PTH 59 runs south of Winnipeg and intersects with the proposed Project transmission line route three times. Rehabilitation of PTH 75 to address perennial flooding concerns with the Red River is also planned. PTH 75 is intersected once by the Project. Though the ROW and transmission towers will be visible from some areas within the LAA, the level of contribution of the Project to cumulative effects to aesthetics is limited due to fact that the Project will be routed in previously disturbed lands that are agricultural in nature.

9.15.6.1.2 Residential Projects

Specific plans for residential development in the Project area include the construction of additional housing in the Sage Creek area within the City of Winnipeg. This development will occur on both sides of the existing Manitoba Hydro-owned ROW south of St. Vital Station. This development would be expected to follow applicable municipal and/or provincial guidelines which would serve to limit interactions with and mitigate Project-related effects. Construction activities are expected to be fully mitigated and would have negligible additive interaction. Effective design mitigation applied to the Project would further serve to mitigate the potential for cumulative effects to occur.

9.15.6.1.3 Energy Projects

Transmission

Construction and operation of the Manitoba to Minnesota Transmission Project (MMTP) and Bipole III (BPIII) Transmission Project may overlap temporally and spatially with the Project. The BPIII project crosses the proposed Project route once, south of Niverville, and traverses the Project RAA. This portion of the BPIII transmission route includes a crossing of Red River and traverses mostly agricultural cropland. Preliminary preferred route options have been identified for the proposed MMTP which have been the subject of its own PEP; the identified route options would use the same Southern Loop corridor as the Project and would cross over the St. Vital-Letellier final preferred route in the RM of Ritchot. Therefore, adverse additive cumulative effects on aesthetics are likely to occur. However, the nature of this cumulative effect is somewhat uncertain due to potential for varying public opinion with respect to visual environments.

Other existing transmission lines within the RAA include the 230-kV La Verendrye to Letellier (Y51L) and Stanley to Letellier (S60L) lines. The St. Vital to Letellier (V95L) transmission line of the Project would also terminate at Letellier Station with these existing lines in the RM of Montcalm.

Wind Energy

The St. Joseph Windfarm is an existing windfarm located near St. Joseph, Manitoba, west of PTH 75, south of PTH 14 and north of PR 421. This windfarm consists of 60 2.3-MW turbines and its presence will overlap spatially and temporally with the RAA and Project if the Project is constructed. The St. Joseph Windfarm is co-located in the RM of Montcalm within the RAA and is visible from the existing Letellier Station. The windfarm is situated in an agricultural-dominated landscape where most turbines have been placed on annual cropland. There are a number of existing, prominent developments on the landscape, including a grain elevator, and existing transmission lines; however, settlements consists of low density rural residences, with many of the properties having established perimeter treelines, which assists in mitigating views. Adverse additive cumulative effects on aesthetics in this area are anticipated, however, due to existing interruption on the landscape and mitigating factors, such as treed lots, the effects are rated not significant.

9.15.6.2 Summary of Project Cumulative Effects on Communities

With the exception of existing and proposed energy projects, other existing or reasonably foreseeable future projects (e.g., highway improvements) in the RAA will be short-term and will not have prominent features that would dominate the viewshed. The concentrating of lines within established ROWs, such as the Southern Loop corridor, reduces the number of receptors affected.

Cumulative effects to change in viewshed are not anticipated to cause an unacceptable change in the aesthetic quality of the above-mentioned locations for the overall populations, and are therefore rated not significant.

9.15.7 Follow-up and Monitoring

Monitoring or follow-up programs related to visual aesthetics are not considered to be warranted due to the findings of this assessment.

9.15.8 Summary

The alteration of rural landscape environments within the RAA for agriculture has already modified its aesthetic value. Routing has sought to maximize co-locationg with existing linear features, use existing transmission line ROWs and where these are not available, avoid close proximity to homes whenever possible. This and the implementation of the mitigation measures described above, the effects of the Project on aesthetics are anticipated to be not significant.

9.16 HERITAGE RESOURCES

9.16.1 Scope of Assessment for Heritage Resources

The assessment of heritage potential is based upon a consideration of the locations of documented archaeological sites, historic land use information, and landscape characteristics that either positively or negatively influence archaeological site distribution. Heritage resource potential was based on proximity to previously recorded archaeological sites; proximity to fresh water sources; terrain and current land use. For this study, heritage resource potential is defined as the capability of the landscape within the RAA, LAA and PDA to have supported the kinds of past activities that would have resulted in the formation and preservation of archaeological remains.

Lands were categorized as having “High,” “Moderate,” or “Low” heritage resource potential. These classes affect the scope and level of effort recommended for future archaeological studies, mitigation, and residual and cumulative effects. High potential relates to lands exhibiting topographic and biophysical attributes highly supportive of past cultural activities that would have left archaeological evidence. Moderate potential consists of lands exhibiting fewer attributes that would have supported past cultural activities than the preceding category; while low potential areas exhibit few characteristics supportive of past cultural activities. Further archaeological investigations are not normally recommended for lands categorized as having low archaeological potential.

9.16.1.1 Regulatory Setting

The transmission line aspects of the Project may require a heritage resource assessment as outlined in Section 12(2) of The *Heritage Resources Act* (1986). The Act stipulates that if the Minister of Manitoba Culture, Heritage and Tourism has reason to believe that heritage resources or human remains that are upon, within or beneath a site are likely to be damaged or destroyed by reason of any work, a heritage resource impact assessment of the project may be required. In Manitoba, potential effects on paleontological resources are also addressed in *The Heritage Resources Act*.

Section 35 of *The Cemeteries Act*, administered by the Manitoba Public Utilities Board, may also be relevant to the Project. This section of the Act discusses consequences of any damage, mutilation, defacing, or removal of any tomb, monument, gravestone, or other structure placed in a cemetery, or any fence, railing, or other work for protection or ornament of a cemetery. It is not anticipated that the transmission line would be constructed through a cemetery, as the location of known cemeteries were taken into consideration during the routing option process.

9.16.1.2 Boundaries

The temporal boundaries for the assessment of the potential environmental effects of the Project on heritage resources include the Construction and Operation and Maintenance components of the Project; see Section 3.7 for the Project construction schedule. Operation and maintenance of the Project will begin following construction and will be carried out until project decommissioning.

Project Development Area (PDA): The PDA for heritage resources includes the area within which all physical construction activities associated with the Project will take place. The PDA includes 119 km of transmission line between St. Vital Station and Letellier Station, and 37 km of transmission line between St. Vital Station and La Verendrye Station, and upgrades at the station sites. For the purposes of this assessment, a 40-m-ROW was used.

Local Assessment Area (LAA): The LAA for the assessment is a 1.0-km-wide corridor (0.5-km buffer on either side of the final preferred route) encompassing the PDA.

Regional Assessment Area (RAA): The RAA for the assessment is a 2.0-km-wide corridor (1.0 km buffer on either side of the final preferred route) encompassing the PDA..

The administrative boundaries for effects to heritage resources pertain to the legislated protection of archaeological sites, heritage buildings, and palaeontological remains through provincial legislation and policy.

Heritage resource impact assessment is regulated by *The Heritage Resources Act* (1986) and reflects the provincial government's commitment to ensuring that Manitoba's heritage is adequately protected from developmental impacts. The Province's "Policy Respecting the Reporting, Exhumation and Reburial of Found Human Remains" (Province of Manitoba 1987) provides policy direction in the event that human remains are encountered during any components of the Project. In addition, the PDA does not intersect with lands reserved for First Nations.

The Project crosses seven municipal districts in Manitoba. Municipal governments have the authority to designate heritage sites under sections of *The Heritage Act.* Municipal designation legally protects a site from the effects of development.

The technical boundaries for the Project included limited information in the heritage database for areas outside of the Red River corridor. A second limitation is the paucity of sites that have been excavated scientifically, as the majority of the archaeological sites in the database are based on surface collections from agricultural fields.

9.16.1.3 Identified Issues and Concerns

Public engagement dealt with providing the public with Project information and receiving input from stakeholders, but did not specifically solicit responses pertaining to heritage resource concerns. No concerns regarding the potential for the Project to affect intact heritage resources from the Pre-contact and Historic Period, and paleontological sites were identified during the PEP.

9.16.2 Project Interactions with Heritage Resources

Project interactions with heritage resources are identified in Table 9.16-1.

Table 9.16-1: Project Interactions with Heritage Resources

Project Activities and Physical Works	Potential Environmental Effect
	Loss or Alteration to Heritage Resources
Construction:	
Clearing	1
Drilling	1
Marshalling Yards	1
Tower Installation	1
Stringing Conductors	0
Presence of Materials and Equipment	0
Site Reclamation	0
Station Upgrades	0
Operation and Maintenance:	
Project Presence	0

Table 9.16-1: Project Interactions with Heritage Resources

Project Activities and Physical Works	Potential Environmental Effect
	Loss or Alteration to Heritage Resources
Maintenance of Infrastructure	0
Vegetation Management	1

KEY:

Project-related Environmental Effects were ranked as follows:

0 = No interaction.

1 = Interaction may occur; however, based on past experience and professional judgment, the resulting environmental effect is well understood and can be managed to acceptable levels through General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). No determination of significance of residual effects or cumulative effects assessment is warranted.

2 = Interaction may occur, and the resulting environmental effect may exceed acceptable levels without implementation of project-specific mitigation. Further assessment is warranted.

9.16.2.1 Justification and Rationale for Interactions Ranked as 1

Based on knowledge of the heritage resources within the PDA, LAA and RAA and the interactions generated by the described clearing, construction, operation and maintenance activities related to this Project, the interactions of the Project with heritage resources VC have been rated as 0, 1, or 2. Where there is an interaction, the use of standard mitigation procedures will reduce any effects to acceptable levels. A Heritage Resources Protection Plan will be implemented for the Project.

9.16.3 Residual Environmental Effects Description Criteria

Potential environmental effects of all Project-related activities on heritage resources were ranked as 0 or 1 in Table 9.16-2; therefore, no residual environmental effects description criteria or significance thresholds are defined for this VC.

9.16.4 Existing Conditions for Heritage Resources

Additional information on heritage resources is provided in Section 6.4.10. Moderate to High potential for archaeological resources are presented in Appendix A.

9.16.4.1 Baseline Data Sources

The majority of the baseline data were acquired from the Historic Resources Branch of Manitoba Tourism, Culture, Heritage, Sport and Consumer Protection or on the Branch’s website. Additional information was gathered form past research and knowledge gained from the collection of baseline data through literature review and the preliminary field program carried out as part of the EA. The results of the preliminary field program are summarized in Appendix A.

9.16.4.2 Baseline Overview

The baseline data indicate that there are no previously recorded heritage resources or designated historic sites within the PDA or LAA. The data also indicate that while most of the previously recorded archaeological sites within the RAA are surface collections from agricultural fields, there is the potential for deeply buried cultural strata in locations adjacent to the Red River. There is a low potential for paleontological resources to be present within the Project RAA.

9.16.5 Project Environmental Effects on Heritage Resources

Potential environmental effects of all Project-related activities on heritage resources were ranked as 0 or 1 in Table 9.16-1; therefore, no determination of significance of residual or cumulative environmental effects are conducted for this VC.

Residual environmental effects to heritage resources would be limited. Sites are generally small horizontally and are scattered across agricultural fields. Residual effects could occur if a portion of an intact archaeological site was exposed during the construction phase and continued to be impacted through erosion and/or unsanctioned artifact collection.

9.16.5.1 Mitigation

It is standard practice for Manitoba Hydro to implement an Heritage Resources Protection Plan as mitigation. The protection plan for this Project should include the following:

- All archaeological finds discovered during site preparation and construction will be left in their original position until the Project Archaeologist is contacted and provides instruction.
- Construction activities will not be carried out within established buffer zones for heritage resources except as approved by Project Archaeologist.
- Environmental protection measures for heritage resources will be reviewed with the Contractor and employees prior to commencement of any construction activities.
- Orientation for project staff working in construction areas will include heritage resource awareness and training including the nature of heritage resources and the management of any resources encountered.
- Orientation information will include typical heritage resource materials and reporting procedures.

- The Contractor will report heritage resource materials immediately to the Construction Supervisor will cease construction activities in the immediate vicinity until the Project Archaeologist is contacted and prescribes instruction.
- The Culture and Heritage Resource Protection Plan will be adhered to during Preconstruction and construction activities.

9.16.5.2 Characterization of Residual Environmental Effects

The environmental effects of the Project on heritage resources will be greatest during the construction phase and will consist of short term clearing, drilling, tower installation and marshaling yards. As the number of previously recorded sites within the PDA and LAA are limited there is a limited potential effects for disturbance.

The effects of operation and maintenance activities on the heritage resources VC will be minimal, as the major effect is vegetation control. Potential effects are not expected to be a concern as the effects will be short-term in duration, intermittent in nature (consistent with fluctuations in construction effort and clearing program intensity), and localized.

9.16.6 Cumulative Environmental Effects on Heritage Resources

Project environmental effects on the heritage resources may interact with those of agricultural or general construction activities. As heritage resources within the plough zone are considered to be disturbed or absent and other construction activities would be required to follow the same legislation, the effect of the combined activities, is not expected to result in discernable cumulative effects to heritage resources.

9.16.7 Follow-up and Monitoring

There is no follow-up or monitoring planned for Heritage Resources beyond required follow-up and/or monitoring under the conditions outlined in the Heritage Resources Protection Plan.

9.16.8 Summary

Project interactions with heritage resources are of primary concern during the construction phase and associated with site clearing, drilling, marshalling sites and tower construction. The Heritage Resources Protection Plan will mitigate these interactions.

9.17 REHABILITATION AND DECOMMISSIONING

This section describes the final phase of transmission line development as applicable to the Project. For the purpose of the EA, the effects assessment focuses on standard project rehabilitation and decommissioning activities, as noted below.

9.17.1 Effects Analysis

Upon completion of transmission line construction, relevant site decommissioning for the Project can include: temporary right-of-way access trails, marshalling yards, and borrow sites. Minor deviations from the right-of-way (i.e., in severe terrain conditions) unless required for ongoing maintenance would not be regularly maintained post construction. Marshalling yards typically established near transmission line routes for the storage of construction materials and equipment. Marshalling yards will be restored to pre-Project conditions, including any site remediation required. Depending upon the pre-Project conditions, sites may be reseeded or allowed to regenerate naturally following construction. New borrow locations required for construction will be reclaimed by promoting regrowth of native vegetation and other mitigation measures in accordance with *The Mines and Minerals Act*.

Mitigation measures to address site decommissioning are subject to Manitoba Hydro's standard protocols and guidelines for the Project (Manitoba Hydro 2011) and include the following:

- Clearing and disturbance outside the project area or worksite will be minimized or avoided.
- Temporary access routes will be decommissioned at the completion of the construction phase under the supervision of Manitoba Conservation and Water Stewardship officials.
- Decommissioned roads will be reclaimed and, after removal of culverts, drainage will be restored and shorelines stabilized.
- Ongoing visual inspection of the worksite will be conducted by the Contractor to ensure adequate restoration and minimal environmental degradation.
- Waste, refuse, structures, material and equipment will be removed from borrow pits and / or quarries by the Contractor at the end of construction.
- Depending on the planned future use of the site and the size of the excavation, pits and quarries will be backfilled with clean mineral soil or granular material, leveled or sloped, and if necessary, revegetated according to reclamation plans submitted to the Mines and Mineral Branch and Manitoba Conservation and Water Stewardship.
- Temporary haul roads to permanently abandoned borrow areas will be decommissioned.
- The restored pit will be monitored by the Contractor for a period of time agreed to with Manitoba Hydro to determine if additional restoration activity is required. If appropriate for the site, revegetation will be allowed to occur naturally.
- Hazardous materials, fuel containers and other materials will be removed from marshalling yard sites.
- Infrastructure will be removed from the work site and whenever possible reused or recycled at another project site as appropriate.
- Garbage and debris will be removed from the site and disposed of in a licensed landfill.

- Revegetation may be required in disturbed areas to: stabilize erodible soils; create or restore wildlife habitat; prevent or delay the invasion of unwanted plant species; or enhance or restore the aesthetic appeal of an area. Sites specifically requiring special treatment after construction will be identified during decommissioning or otherwise, natural revegetation will be allowed to occur.

All cleanup and rehabilitation activity for transmission line construction sites will also be subject to the requirements of the Project-specific Environmental Protection Plan.

9.17.2 Determination of Significance

Mitigation measures are based on applying engineering practices and scheduling of activities. Based on the mitigation measures cited above, the effects associated with the rehabilitation and decommissioning phase of the Project are anticipated to be not significant.

9.17.3 Follow-up and Monitoring

No additional specific follow-up or monitoring measures, beyond the mitigation measures already identified, would be required.

9.18 EFFECTS OF THE ENVIRONMENT ON THE PROJECT

9.18.1 Scope of Assessment for Effects of the Environment on the Project

This section defines the scope of the assessment of Effects of the Environment on the Project in consideration of the regulatory setting, potential Project-VC interactions, and existing knowledge.

Effects of the environment on the Project refer to the forces of nature that could affect the Project physically or hamper the ability to carry out the Project activities in their normal, planned manner.

Typically, potential effects of the environment on any project are a function of project or infrastructure design and the risks of natural hazards and influences of nature. These effects may result from physical conditions, landforms and general site characteristics that may act on the Project such that Project components, schedule and/or costs could be substantively and adversely changed.

While environmental forces (e.g., severe weather, climate change) have the potential to adversely affect the Project, good engineering design considers and accounts for these effects and the associated loadings or stresses on the Project that may be caused by these environmental forces. The methodologies used for mitigating potential effects of the environment on the Project are inherent in the planning, engineering design, construction, and planned operation of a well-designed Project expected to be in service for several decades or longer.

A variety of environmental attributes have the potential to have an effect on the Project. These were determined based on a review of known past and existing conditions and knowledge gained through projections of potential future conditions, such as the potential effects of climate change. The environmental attributes selected for consideration in this EA include the following:

- Severe weather events
- Climate change

These environmental attributes are considered to be those of highest likelihood or of highest consequence if they were to occur.

9.18.1.1 Selection of Effects

For the purpose of this EA, the effects assessment of potential effects of the environment on the Project is focused on the following effects:

- Delays in construction and/or operation and maintenance
- Damage to infrastructure
- Reduced visibility impacting public health and safety

9.18.1.2 Boundaries

The temporal boundaries for the assessment of the potential environmental effects of the Project on the effects of the environment on the Project include the periods of construction (approximately April 2015 to July 2017) and operation and maintenance (until the end of its useful life).

The spatial boundaries for the assessment of effects of the environment on the Project are limited to the PDA as described below.

Project Development Area (PDA): The PDA includes the area within which all physical construction activities associated with the Project will take place. The PDA includes 119 km of transmission line between St. Vital Station and Letellier Station, and 37 km of transmission line between St. Vital Station and La Verendrye Station, and upgrades at the station sites. For the purposes of this assessment, a 40-m-wide ROW was used.

9.18.1.3 Residual Environmental Effects Rating Criteria

A significant adverse residual effect of the environment on the Project would be one that directly results in:

- A substantial loss of the Project schedule (e.g., delay resulting in the construction period being extended by greater than six months).
- A substantive interruption in service to Manitoba Hydro customers.
- Damage to infrastructure resulting in repairs that could not be technically or economically implemented

9.18.2 Effects Analysis

The effects of the environment on the Project considers any change to the Project that may be caused by the environment. The Project will be designed, constructed, and operated in compliance with various codes, standards, beneficial practices, acts, and regulations that govern the required structural integrity, safety, reliability, and environmental and operating performance of the Project to minimize the potential for adverse effects of the environment on the Project.

There are no environmental factors that are expected to interact substantially with the construction of the Project. While some weather-related delays are possible, they are not likely to adversely affect the Project construction, schedule, or cost. During operation and maintenance the transmission lines and the stations will be subject to severe weather events. Manitoba Hydro designs its infrastructure to withstand extreme weather; however, it is not possible to design for all eventualities. Severe weather which has negatively affected the Manitoba Hydro system in the past includes tornados, ice storms and floods. There is potential for any of these to occur in the Project PDA.

Mitigation measures include, applying engineering practices and scheduling of activities to account for possible weather disruptions.

9.18.3 Potential Effects of Climate Change on the Project

Over the next 100 years, Manitoba will likely experience warmer temperatures, a greater frequency of storm events, increasing storm intensity and an increase in annual precipitation (Manitoba Hydro Climate Change Report 2012-13). Potential effects of climate change on operation and maintenance of the Project would be related to increases in the frequency of severe weather events, changes in temperature and changes in precipitation. It is expected that increases in extreme weather events would potentially affect operation and maintenance of the Project by increasing unexpected maintenance due to storm damage. Changes in temperature could affect the freeze/thaw cycle which will result in decreased foundation stability and potentially increased maintenance. The Project will be designed, constructed, and operated in compliance with various codes, standards, beneficial practices, acts, and regulations that govern the required structural integrity, safety, reliability, and environmental and operating performance of the Project.

Mitigation measures include, applying engineering practices and scheduling of activities to account for possible weather disruptions.

9.18.4 Determination of Significance

Based on the above, the effects of the environment on the Project during all phases of the Project are rated not significant. This prediction is made with a moderate level of confidence, because of the uncertainty in the potential changes to local, regional, and global climate that could occur over the life of the Project.

9.18.5 Follow-up and Monitoring

No specific follow-up or monitoring measures are required or recommended.

9.19 ACCIDENTS, MALFUNCTIONS, AND UNPLANNED EVENTS

Accidents, malfunctions, and unplanned events are accidents or upset events or conditions that are not planned as a part of routine Project activities during any Project phase. Even with the planning and application of mitigation, accidents, malfunctions, and unplanned events could occur during any phase of the Project. These could occur as a result of abnormal operating conditions, wear and tear, human error, equipment failure, and other possible causes. Many accidents, malfunctions, and unplanned events are preventable and can be readily addressed or prevented by good planning, design, equipment selection, hazards analysis and corrective action, emergency response planning, and mitigation.

9.19.1 Methodology

In this section, the potential accidents, malfunctions, and unplanned events that could occur during any phase of the Project and potentially result in significant adverse environmental effects are described, discussed, and assessed. The focus is on credible accidents that have a reasonable probability of occurrence, and for which the resulting environmental effects could be significant in relation to the identified thresholds of significance for each VC (previously identified, as applicable).

It is noted that accidents, malfunctions, and unplanned events are evaluated individually, in isolation of each other, as the probability of a series of accidental events occurring in combination with each other is very minimal. These possible events, on their own, generally have a very low probability of occurrence and thus their environmental effects are of low likelihood. They have an even lower probability or likelihood of occurring together – thus their combination is not considered credible, nor of any measurable likelihood of occurrence.

Accidents, malfunctions, and unplanned events have been selected by the Study Team to complete the assessment. The Study Team has conservatively selected scenarios that represent higher consequence events that would also address the consequences of less likely or lower consequence scenarios.

9.19.2 Identification of Accidents, Malfunctions, and Unplanned Events

The accidents, malfunctions, and unplanned events that have been selected by the Study Team, based on its experience, experience elsewhere and professional judgment, are as follows:

- Worker Accident: Worker accidents may occur during either Construction or Operation, and may result in harm, injury, or death to one or more Project workers.
- Fire: Consists of a fire in a Project component. The focus is on the consequence, and not the mechanism by which it occurs.
- Hazardous Materials Spill: Spills of fuel, petroleum products, and/or other chemicals used on site or in Project components.
- Vehicle Accident: Project-related vehicle accidents that could occur on the road transportation network.

9.19.3 Environmental Effects Assessment

The potential interactions between the selected accidents, malfunctions, and unplanned events that could occur during the construction, operation, or decommissioning of the Project and each relevant VC are identified in Table 9.19-1 below.

Table 9.19-1: Potential Interactions Between Selected Accidents, Malfunctions and Unplanned Events

Accident, Malfunction or Unplanned Event	Atmospheric Environment	Groundwater Resources	Aquatic Resources	Wildlife	Natural Vegetation	Traditional Land Use	Infrastructure and Services	Employment and Economy	Property and Residential Development	Agricultural Land Use	Non-Agricultural Land Use	Communities	Heritage Resources
Worker Accident	0	0	0	0	0	0	0	0	0	0	0	1	0
Fire	1	0	1	1	1	1	1	0	1	1	1	1	0
Hazardous Material Spill	0	1	1	1	1	0	0	0	0	1	0	0	0
Vehicle Accident	1	0	0	0	1	0	1	0	0	0	0	1	0
Discovery of Heritage Resource	0	0	0	0	0	0	0	0	0	0	0	0	0

KEY:

Project-related Environmental Effects were ranked as follows:

0 = No interaction.

1 = Interaction may occur; however, based on past experience and professional judgment, the resulting environmental effect is well understood and can be managed to acceptable levels through General Environmental Protection Measures (Chapter 10), which are based on codified practices, proven, effective mitigation measures or beneficial management practices (BMPs). No determination of significance of residual effects or cumulative effects assessment is warranted.

2 = Interaction may occur, and the resulting environmental effect may exceed acceptable levels without implementation of project-specific mitigation. Further assessment is warranted.

9.19.3.1 Interactions Ranked as 1

9.19.3.1.1 Worker Accident

A worker accident has the potential to interact with communities as it may result in harm, injury, or death to workers. A worker accident will not interact with any other VC and thus its effects on these other VCs for which the interactions were ranked as 0 in Table 9.19-1 are not discussed further.

All workers will be properly trained in practices to prevent workplace accidents including Workplace Hazardous Materials Information System (WHMIS), first aid, and other applicable training programs. These procedures are designed to prevent serious injury to staff and the general public as well as to minimize the occurrence of unplanned events and minimize any potential damage to the environment.

Interactions between a worker accident and communities will be mitigated by compliance with health and safety legislation, safety by design, and implementation of environmental management measures aimed at protecting human health. Safety risks to workers will be reduced by complying with the requirements of various governing standards including the federal Canada Labour Code, the federal *Transportation of Dangerous Goods Act*, the *Manitoba Workplace Health and Safety Act* and all associated regulations. Adherence to public safety codes and regulations will help the Project to be carried out in a safe manner to protect workers and the public.

With the application of, and compliance with, these acts, regulations, and standards, including the application of safety and security measures that are known to effectively mitigate the potential environmental effects, the potential environmental effects of a worker accident on communities during construction and operation and maintenance of the Project are rated not significant.

9.19.3.1.2 Fire

A fire at the Project location could interact with the atmospheric environment (smoke emissions), infrastructure and services (stress on services) communities (potential safety risks to workers), land use and property (potential for substantive loss or damage to property of resources), and the aquatic, wildlife and natural vegetation environments (potential contamination with sediment-laden water used in extinguishing the fire). A fire will not interact with any other VC and thus its environmental effects on these other VCs for which the interactions were ranked as 0 in Table 9.19-1 and are not discussed further.

A fire may arise from Project heavy equipment or from natural causes such as a lightning strike. In the unlikely event that a fire occurred, the immediate concern for a fire would be for human health and safety. Local air quality conditions may deteriorate through the duration of the fire.

Personnel will take the necessary precautions to prevent fire hazards when at the work site and will keep the site free of all flammable waste. Manitoba Hydro will ensure that personnel are trained in the use of fire-extinguishing equipment. In the unlikely event of a fire, local emergency response will be able to reduce the severity and extent of damage.

The emissions from a fire would likely consist mainly of smoke (particulate matter) and CO_2 but could also include CO, NO_2, SO_2, and other products of incomplete combustion. A large fire could create particulate matter levels greater than the ambient air quality standard over distances of several kilometers, but such situations would be of short duration, infrequent, and are not expected to occur because of planned mitigation and prevention measures.

The potential environmental effects of a fire on potentially affected VCs are rated not significant.

9.19.3.1.3 Hazardous Material Spill

A hazardous material spill may interact with the atmospheric environment, groundwater resources, aquatic resources, wildlife, vegetation and agricultural land use. A hazardous material spill will not interact with any other VC and thus its environmental effects on these other VCs for which the interactions were ranked as 0 in Table 9.19-1 and are not discussed further.

Hazardous materials could potentially be released into the air, soils, surface water or groundwater as a result of an accidental spill of solvents, fuels, herbicides etc., during construction or operation and maintenance activities.Project activities including marshalling yard development and use, the presence of material and equipment and vegetation and infrastructure maintenance have the potential to contaminate surface-water quality through the release of deleterious substances (e.g., fuel spills, releases of other potentially toxic materials). The most common potential deleterious chemical substances entering watercourses from Project activities tend to be hydrocarbons and herbicides. In general, spilled hydrocarbons have the potential to affect freshwater organisms both directly, (through physical and toxicological processes), and indirectly, (through habitat effects, nutrient-cycling disruptions, and alterations in community and trophic relationships). Direct biological effects to fish SOCC include damage to fish gill membranes, fish mortality, irregular behavior, and impaired reproduction from contact with spilled hydrocarbons while indirect effects include substantial decreases in invertebrate populations. Effects to critical fish habitat include the loss/alteration of riparian vegetation (resulting from post-spill macrophyte cutting and oil-induced effects on vegetation stands) and the loss/alteration of spawning habitat and food sources by sinking particulates clogging substrate interstitial spaces. Implementation of BMPs, SOPs, along with a detailed spill response plan and a well-designed EnvPP will ensure minimal potential effects to aquatic resources through accidental releases to watercourses.

Fuel and oil leakage or other debris from equipment staging may cause soil contamination, which can cause direct mortality of natural vegetation. If soil contaminants flow to wetlands in the area, there may be direct mortality of wetland plants. As it is anticipated that marshaling yards/equipment storage will be just off roads, and not in prairie habitat, no effects to SAR/ SOCC are anticipated.

A spill of fuel, oil, lubricants, or other hazardous materials may occur during construction or operation and maintenance activities, through damage to vehicles, and leaks from Project components. Any spill is usually highly localized and easily cleaned up by on-site crews using standard equipment. Large quantities of hazardous materials will not be used by or stored as part of the Project, therefore a large spill is not considered to be a possibility.

The contractor will be required to provide environmental training, as well as training in spill prevention and response to Construction personnel. Prior to the commencement of construction activities, Manitoba Hydro will ensure that spill response equipment is readily available. All spills will immediately be contained, cleaned, and reported to applicable authorities as per the following guidelines:

- All contaminated material or potentially hazardous material will be contained.
- Proper safety precautions (e.g., protective clothing and footwear) will be taken.
- The Proponent will follow their Spill Response Policy and will ensure that Manitoba Conservations and Water Stewardship's spill reporting line (204-944-4888) is notified for reportable spills.
- Contaminated wastes, such as used cleaning cloths, absorbents, and pads, will be stored in proper waste containers.
- Waste material will be disposed of at approved disposal facilities.

Construction equipment will be cleaned and maintained in good working condition, with visual inspections of equipment performed on a regular basis. Petroleum products such as gasoline, diesel fuel, and oil will be properly labeled in accordance with the appropriate legislation and regulations. Refuelling, oiling, and maintenance of equipment, as well as storage of hazardous materials, will be conducted in a designated and contained area(s). Servicing of equipment (e.g., oil changes and hydraulic repairs) will be completed off-site when possible. Vehicles will be equipped with spill containment and cleanup materials.

Personnel handling fuels and hazardous wastes will have WHMIS training and will be qualified to handle these materials in accordance with the manufacturer's instructions and applicable regulations. Hazardous waste and storage area(s) will be clearly marked and secured. Industrial waste will be reused or recycled on a priority basis. Where reuse or recycling opportunities are not available, industrial waste will be collected and disposed of at an approved facility. Garbage receptacles for solid non-hazardous wastes will be available. These wastes will be collected on a regular basis or as they are generated and will be disposed of at approved locations. With these mitigation measures and emergency response procedures implemented, and because of the low likelihood of such events, the potential environmental effects of a hazardous material spill on groundwater resources, aquatic environment, and terrestrial environment during construction and operation and maintenance of the Project are rated not significant.

9.19.3.1.4 Vehicle Accident

A vehicle accident arising from Project-related activities may interact with atmospheric environment, infrastructure and services and communities. A vehicle accident will not interact with any other VC and thus its environmental effects on these other VCs for which the interactions were ranked as 0 in Table 9.19-1 and are not discussed further. Note that the potential for a fire or hazardous material spill which could be associated with a vehicle accident or other means has been addressed above.

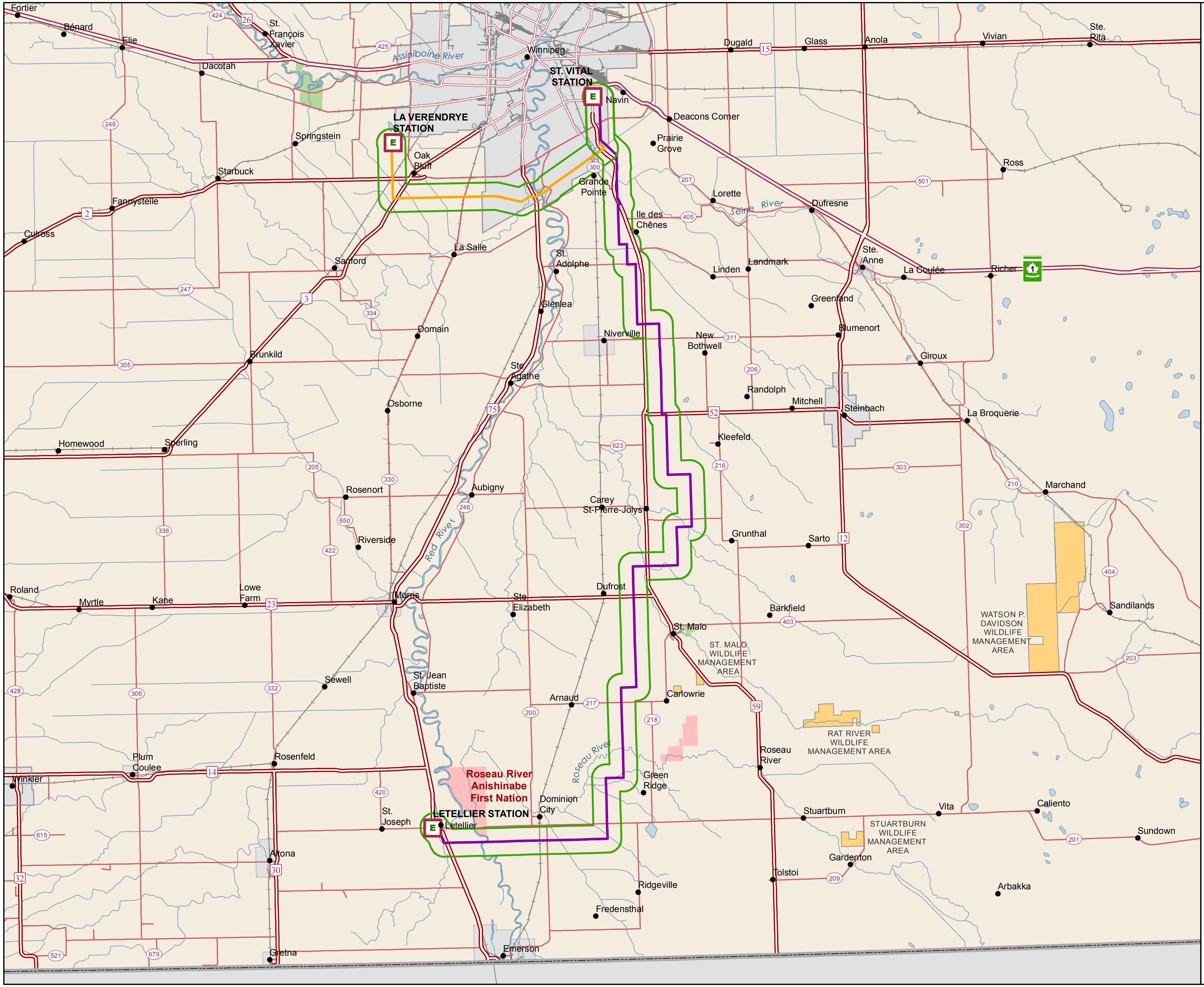
The potential for a vehicle accident to occur exists during construction and operation and maintenance phase of the Project. Worker traffic and truck traffic to and from the site, and the operation of heavy equipment on-site during construction have the potential to result in a vehicle accident during construction. The Project-related vehicles will observe all traffic rules and provincial and federal highway regulations. Trucking activity will observe speed limits and weight restrictions. Because the Project will comply with all applicable traffic rules and regulations, the nominal increase in traffic volumes as a result of the Project, and because safety measures will be implemented during construction, the potential environmental effects of a vehicle accident on affected VCs are rated not significant.

9.19.4 Determination of Significance

The Project is being designed, and will be constructed and operated with the utmost regard for health, safety, and environmental protection to minimize its potential environmental effects that could result during the normal course of construction and operation and maintenance as well as those that could result from accidents, malfunctions, and unplanned events.

The careful planning of the Project and the implementation of proven and effective mitigation will minimize the potential for accidents, malfunctions, and unplanned events events to occur. The effects of an individual accident or unplanned event could have significant effects on a localized extent. For example, a grass fire could negatively affect nesting birds or a spill could affect surface or groundwater quality. However, the potential for these events to occur, given the measures that will be undertaken to prevent their occurrence, is low. In the very unlikely and improbable event that an accidents, malfunctions, and unplanned events of any considerable magnitude were to occur, it would be of a short duration, low frequency, or limited geographic extent such that significant adverse environmental effects to any VC would be unlikely to occur.

Overall, given the nature of the Project and credible accidents, malfunctions, and unplanned events considered, and in light of the nature of the Project and proposed mitigation, the potential environmental effects of all Project-related accidents, malfunctions, and unplanned events on all VCs during all phases of the Project, are rated not significant.



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

E	Electrical Station
▬	Final Preferred Route (V95L) and Project Development Area (PDA - 40m)
▬	La Verendrye-St.Vital (Y36V) Transmission Line

Spatial Boundaries

☐	Local Assessment Area (LAA - 3km)

Landbase

●	Community
1	Trans Canada
20	Provincial Highway
—	Provincial Road
┼	Railway
▨	City / Town
🟥	First Nation
🟩	Provincial Park
🟧	Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN,
Date Created: May 16, 2014

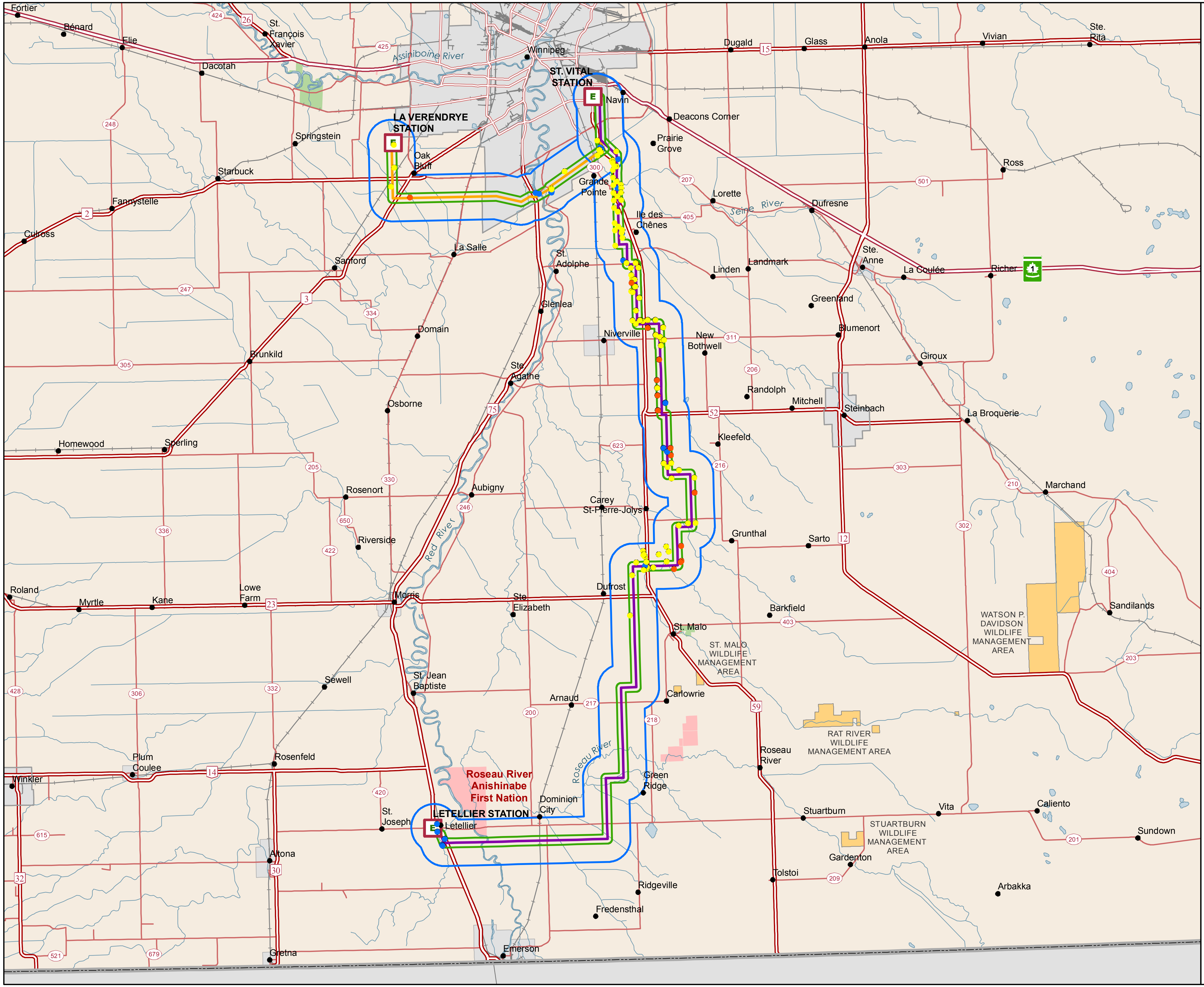
N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Atmospheric Environment Spatial Boundaries

Map 9-1



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- E Electrical Station
- Final Preferred Route (V95L) and Project Development Area (PDA - 40m)
- La Verendrye-St.Vital (Y36V) Transmission Line

Spatial Boundaries

- 🟩 Local Assessment Area (LAA - 1km)
- 🟦 Regional Assessment Area (RAA - 5km)

Groundwater Wells

- ● Domestic
- ● Livestock
- ● Undetermined

Note: The Location of wells are approximate and sometimes arbitrary (e.g.: plotted in middle of quarter section) when the specific location is unknown.

Landbase

- ● Community
- 1 Trans Canada
- 20 Provincial Highway
- Provincial Road
- Railway
- City / Town
- First Nation
- Provincial Park
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN,
Date Created: May 21, 2014

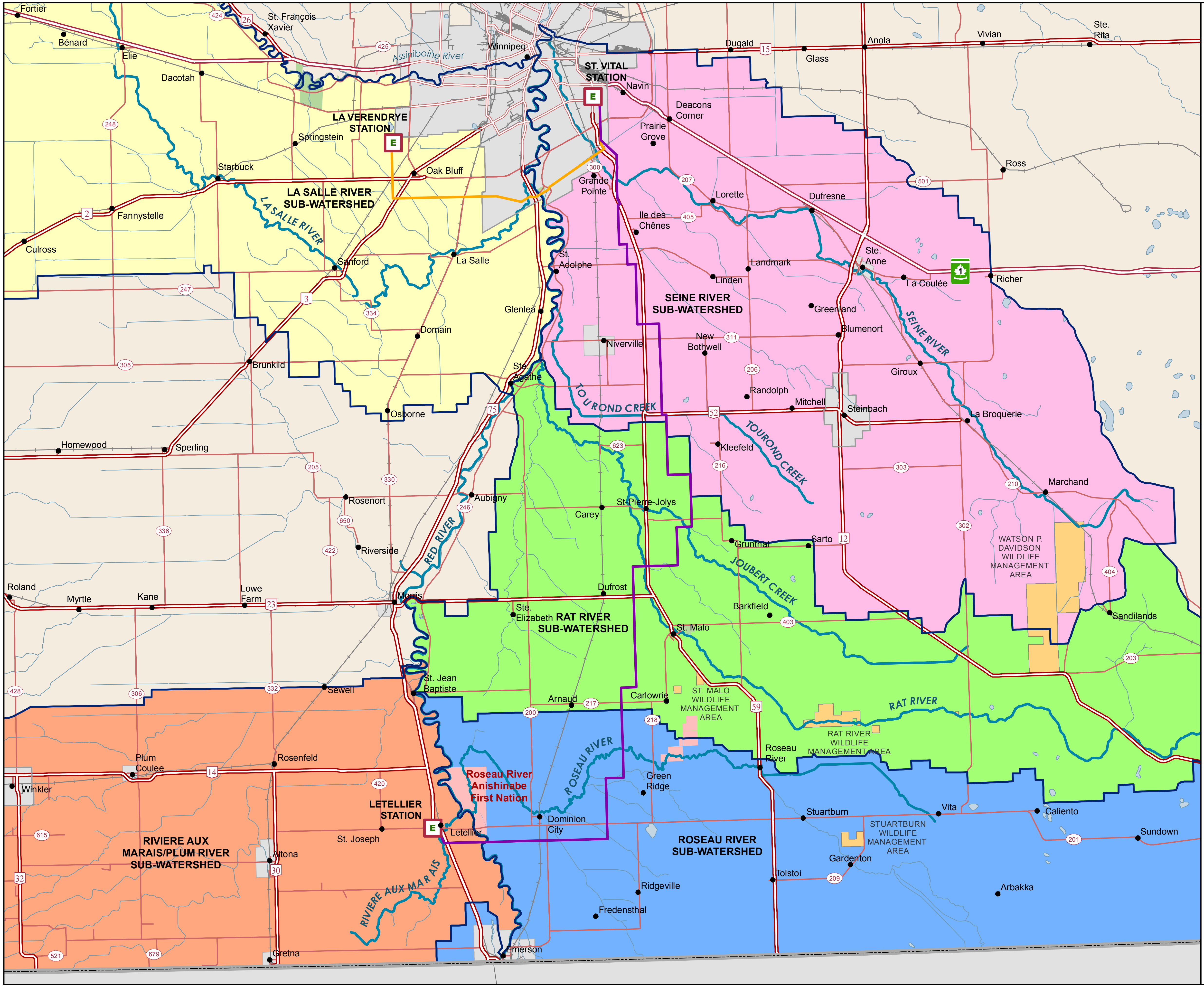
N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Groundwater Resources Spatial Boundaries

Map 9-2



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

E	Electrical Station
—	Final Preferred Route (V95L) and Project Development Area (PDA - 40m)
—	La Verendrye-St.Vital (Y36V) Transmission Line

Aquatics Regional Assessment Area

—	Watercourse Crossing
🟨	La Salle River Sub-watershed
🟩	Rat River Sub-watershed
🟧	Riviere Aux Marais / Plum River Sub-watershed
🟦	Roseau River Sub-watershed
🟪	Seine River Sub-watershed

Landbase

●	Community
1	Trans Canada
20	Provincial Highway
—	Provincial Road
+	Railway
▢	City / Town
▢	First Nation
🟩	Provincial Park
🟨	Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN,
Date Created: May 21, 2014

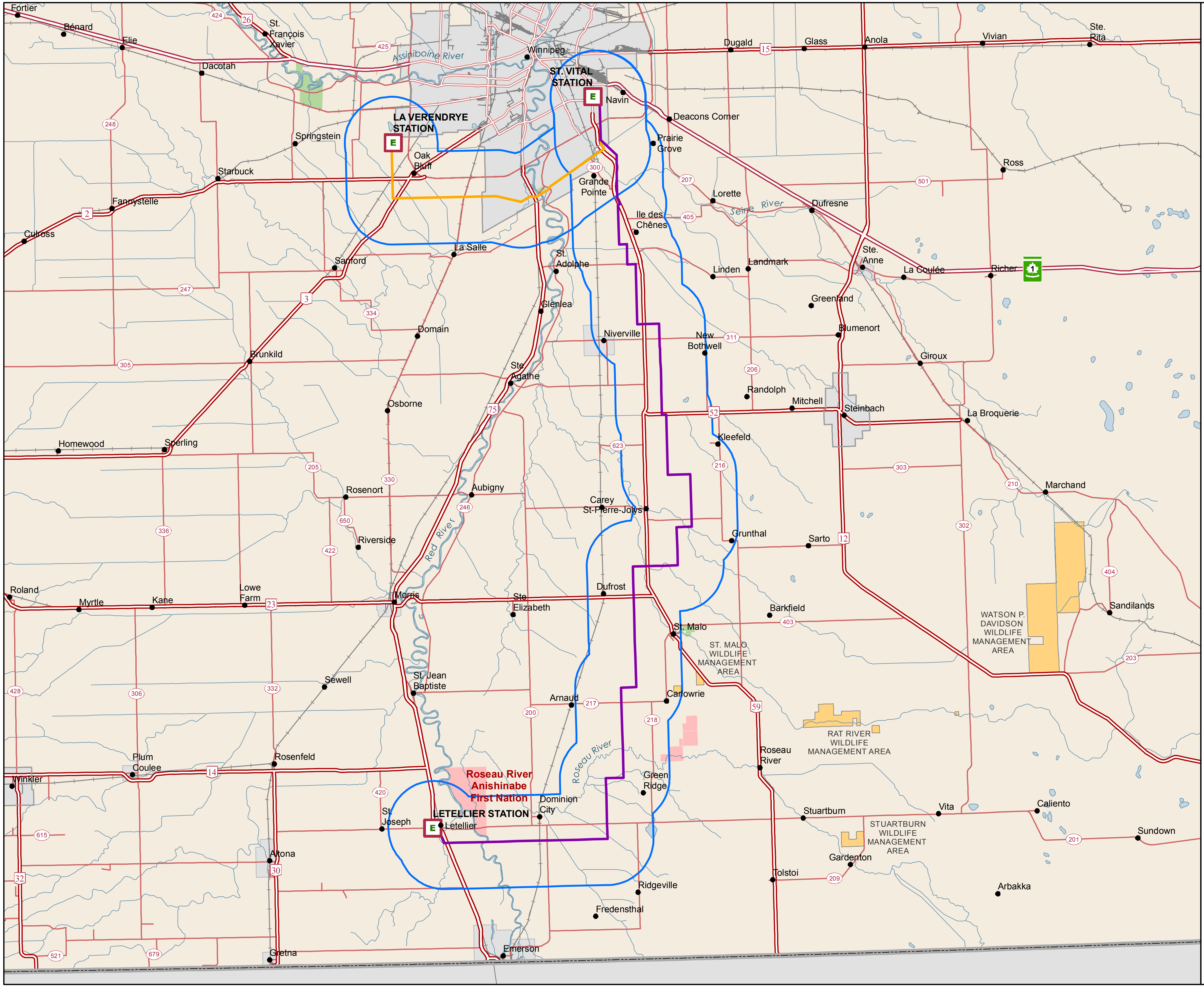
N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Aquatic Resources Spatial Boundaries

Map 9-3



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

E	Electrical Station
▬	Final Preferred Route (V95L), Project Development Area (PDA - 40m) and Local Assessment Area (LAA - 40m)
▬	La Verendrye-St.Vital (Y36V) Transmission Line

Spatial Boundaries

▭	Regional Assessment Area (RAA - 10 km)

Landbase

●	Community
1	Trans Canada
20	Provincial Highway
—	Provincial Road
┼	Railway
▨	City / Town
🟥	First Nation
🟩	Provincial Park
🟧	Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN,
Date Created: May 21, 2014

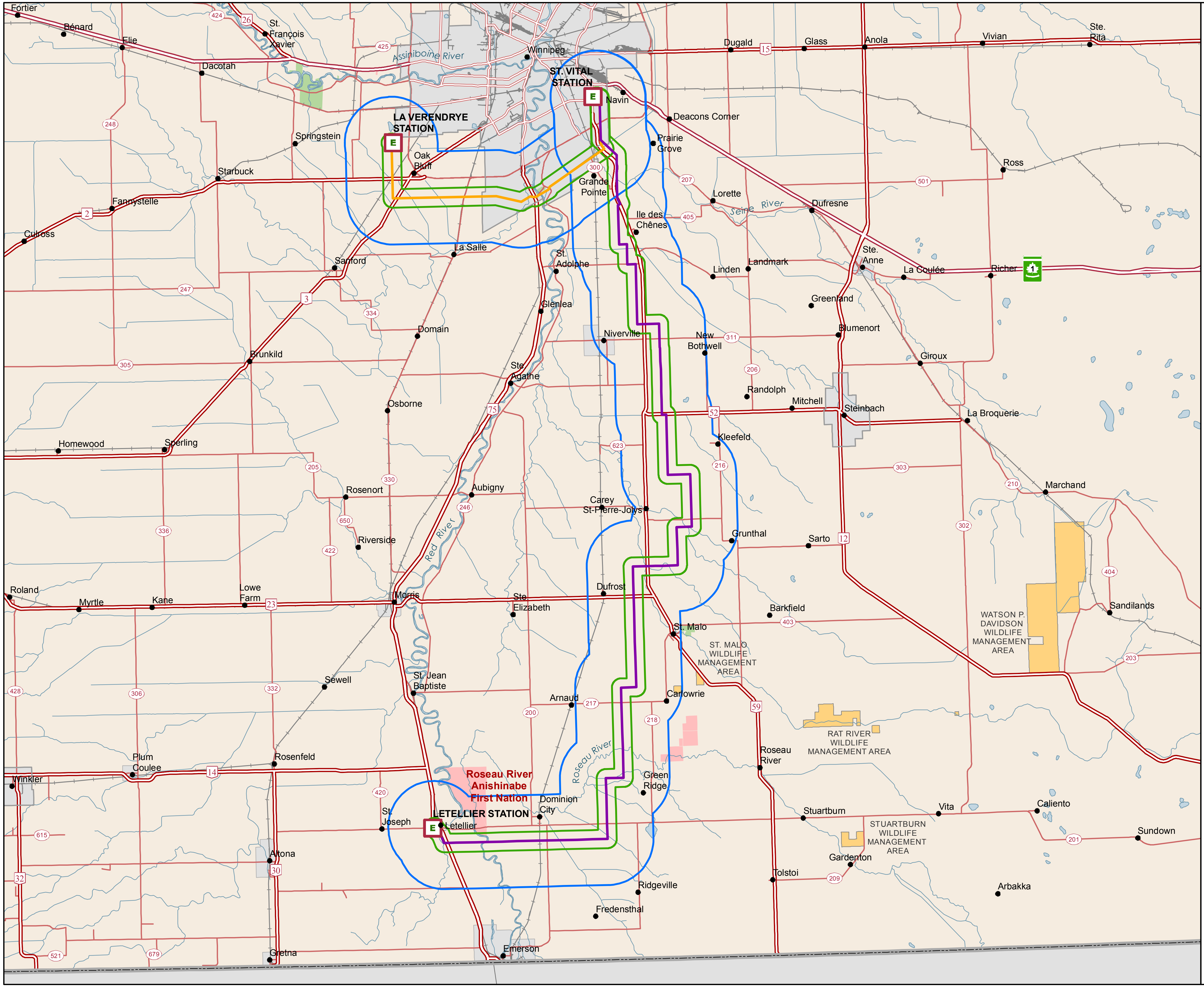
N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Natural Vegetation Spatial Boundaries

Map 9-4



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- E Electrical Station
- Final Preferred Route (V95L) and Project Development Area (PDA - 40m)
- La Verendrye-St.Vital (Y36V) Transmission Line

Spatial Boundaries

- ☐ Local Assessment Area (LAA - 2km)
- ☐ Regional Assessment Area (RAA - 10km)

Landbase

- ● Community
- Trans Canada
- Provincial Highway
- Provincial Road
- Railway
- City / Town
- First Nation
- Provincial Park
- Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN,
Date Created: May 21, 2014

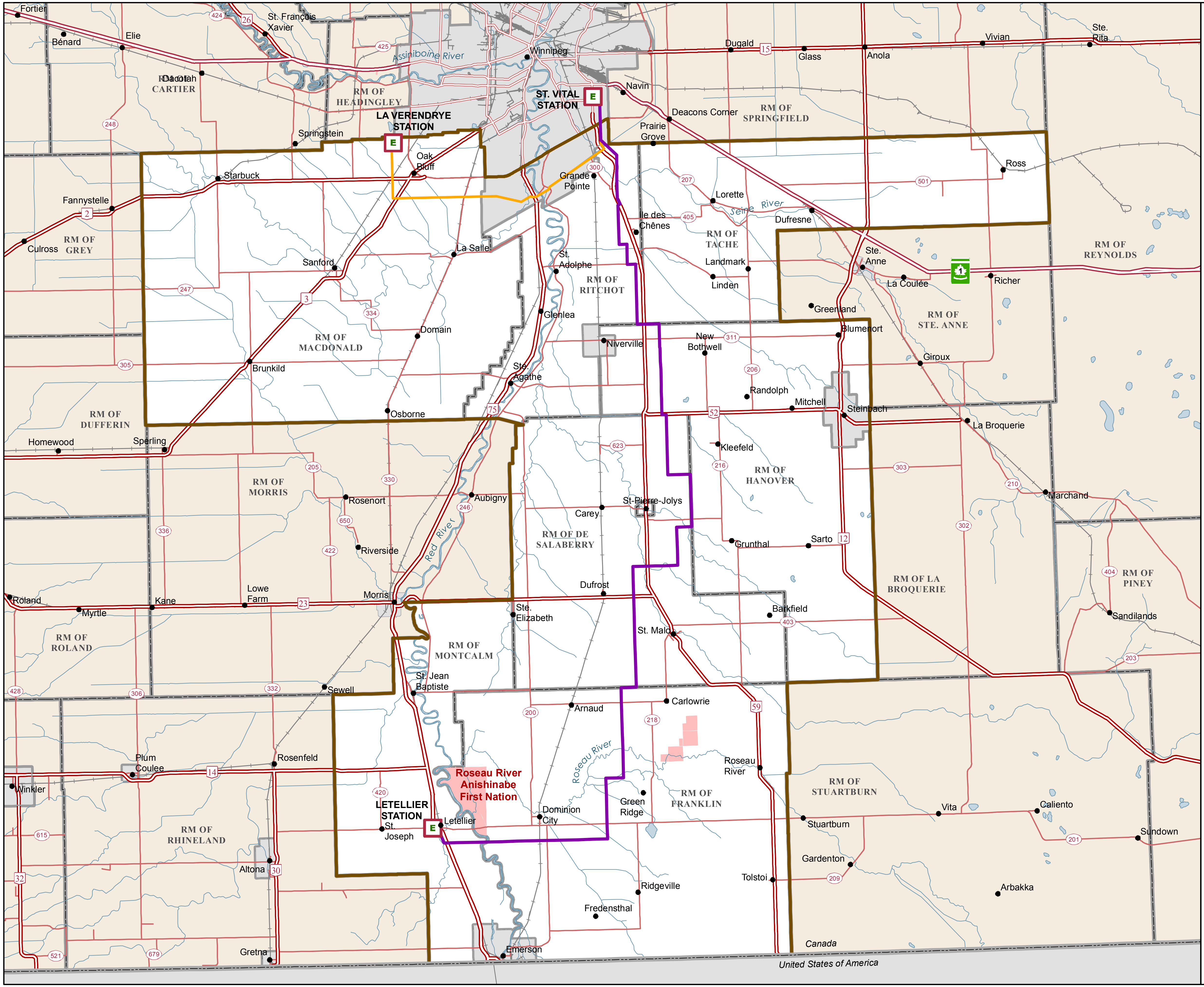
N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Birds, Mammals and SOCCS Spatial Boundaries

Map 9-5



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

E Electrical Station

— Final Preferred Route (V95L)

— La Verendrye-St. Vital (Y36V) Transmission Line

▭ Socio-economic Regional Assessment Area

Landbase

● Community

1 Trans Canada

20 Provincial Highway

— Provincial Road

+ Railway

▭ City / Town

▭ Rural Municipality

🟥 First Nation

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 21, 2014

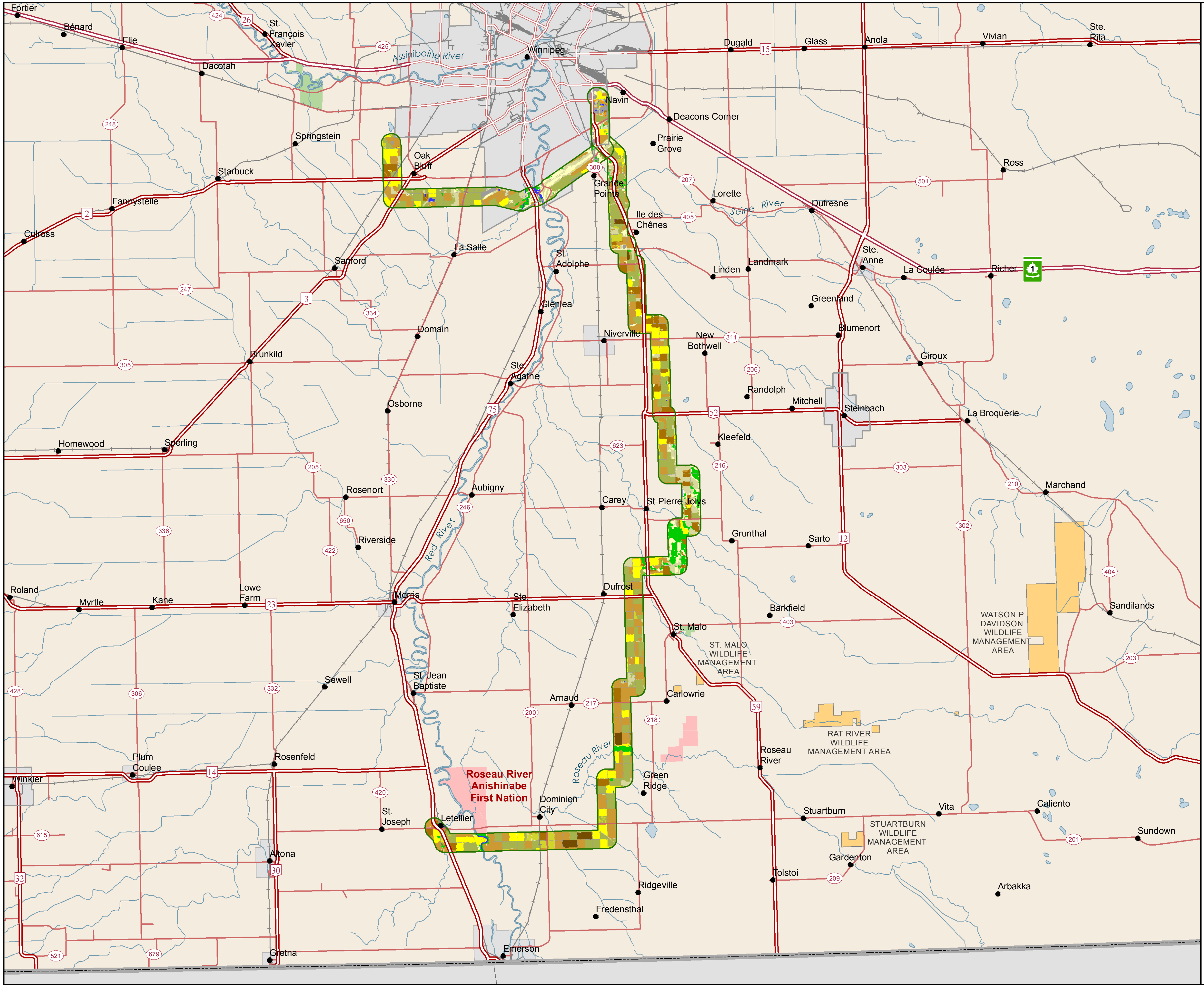
N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Socio-economic Regional Assessment Area

Map 9-6



Manitoba Hydro

St. Vital Transmission Complex

Spatial Boundaries

- ▭ Local Assessment Area (LAA - 2km)

Land Cover

Row Crop

- 🟫 Corn
- 🟫 Sunflower
- 🟫 Soybeans

Crop

- 🟩 Wheat
- 🟩 Winter Wheat
- 🟨 Barley
- 🟨 Oats
- 🟨 Rye
- 🟨 Canola
- 🟪 Flaxseed

Forage and Grazing

- 🟨 Pasture\Forage
- 🟨 Grassland

Non-Agricultural

- 🟦 Water
- ⬜ Urban
- 🟩 Broadleaf

Landbase

- ● Community
- Trans Canada
- Provincial Highway
- Provincial Road
- Railway
- ⬜ City / Town
- 🟥 First Nation
- 🟩 National/Provincial Park
- 🟧 Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN,
Date Created: May 21, 2014

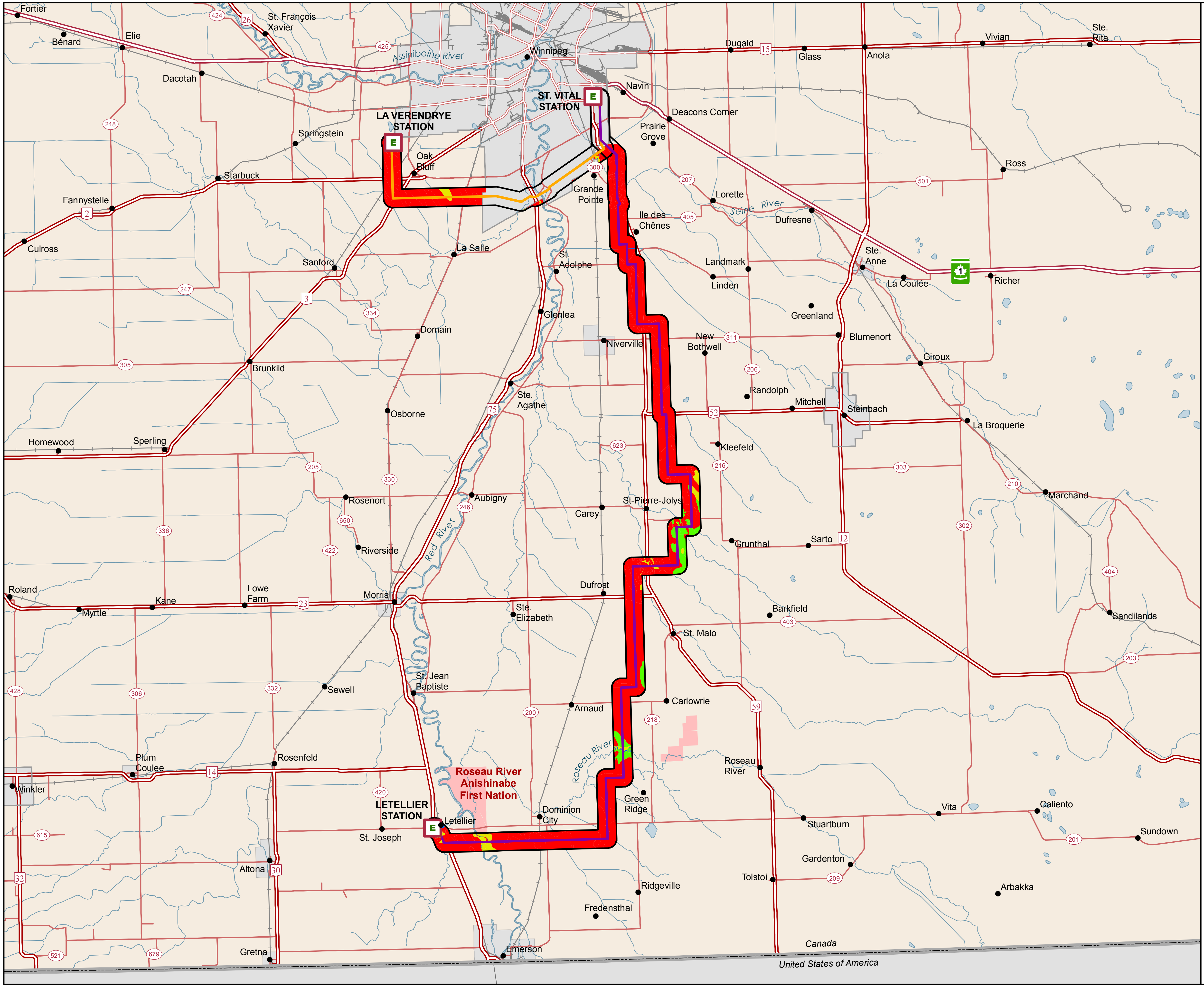
N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Crop Types within the Local Assessment Area in 2013

Map 9-7



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

E Electrical Station

Final Preferred Route (V95L) and Project Development Area (PDA - 40m)

La Verendrye-St. Vital (Y36V) Transmission Line

Spatial Boundaries

☐ Local Assessment Area (LAA - 2 km)

Soil Compaction Risk

🟩 Low Risk to Compaction

🟨 Medium Risk to Compaction

🟥 High Risk to Compaction

🟦 Not Applicable (Water)

Landbase

● Community

Trans Canada

Provincial Highway

Provincial Road

Railway

City / Town

First Nation

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 21, 2014

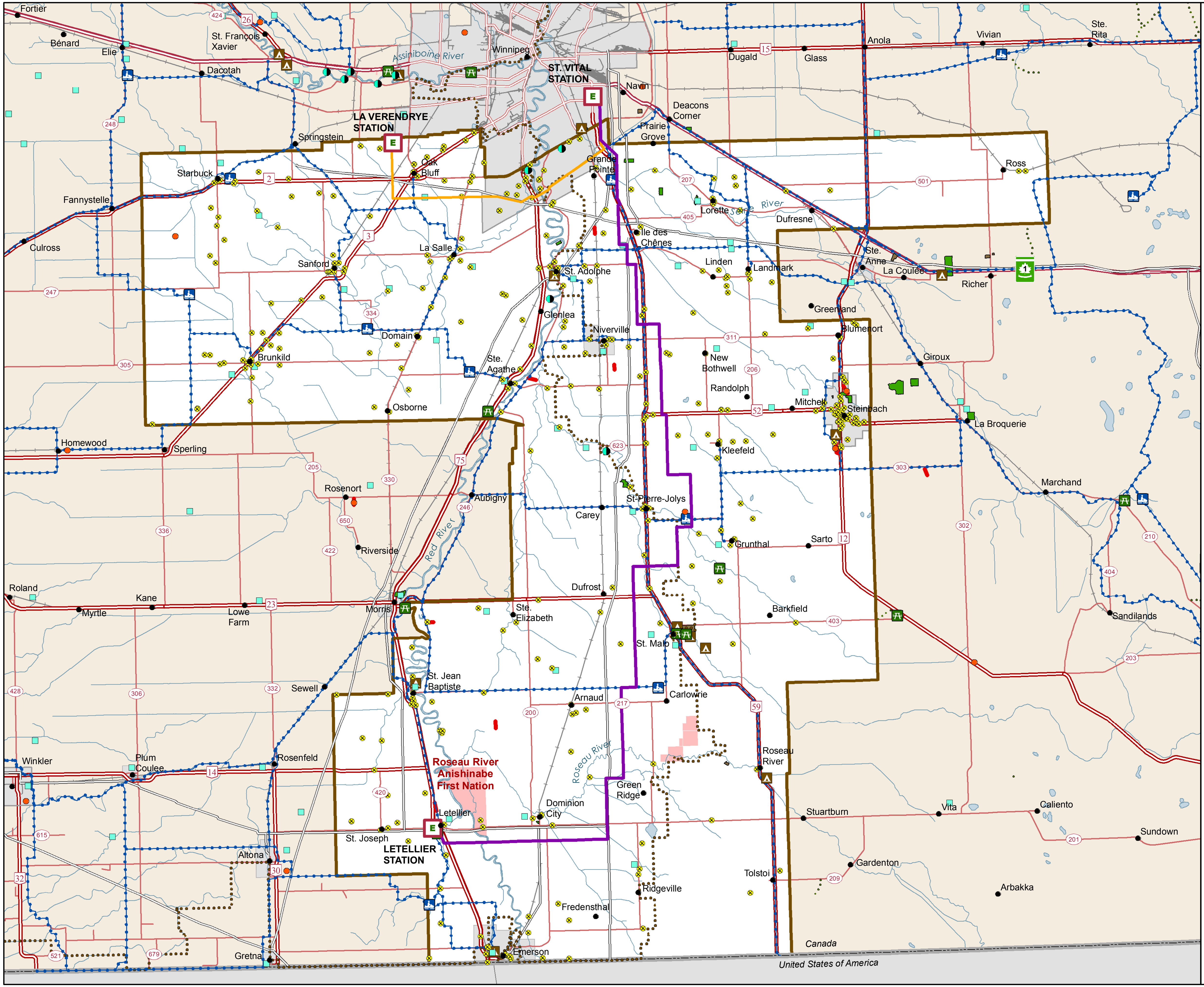
N

0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Soil Compaction Risk

Map 9-8



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- E Electrical Station
- Final Preferred Route (V95L)
- La Verendrye-St. Vital (Y36V) Transmission Line
- ▭ Socio-economic Regional Assessment Area

Infrastructure

- ⊗ Broadcast or Communication Tower
- Pipeline
- 🟦 Lagoon
- ◐ Treatment Plant
- ● Aerodrome
- 🟥 Aerial Applicator Strip

Recreation

- Picnic Area
- Campground
- Snowmobile Shelter
- Snowmobile Trail
- Trails
- Trans Canada Trail
- 🟩 Golf Course
- 🟫 Campground / Resort
- ▨ Recreational Park

Landbase

- ● Community
- Trans Canada
- Provincial Highway
- Provincial Road
- Railway
- City / Town
- First Nation

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 21, 2014

N

0 5 10 Kilometres
0 2.5 5 Miles
1:400,000

Land Use and Recreation within the Socio-economic Regional Assessment Area

Map 9-9

10.0 ENVIRONMENTAL PROTECTION, FOLLOW-UP AND MONITORING

10.1 INTRODUCTION

Mitigation measures, monitoring and other follow-up actions identified in the effects assessment (Chapter 9) will be implemented through an Environmental Protection Program. Manitoba Hydro's Environmental Protection Program provides the framework for implementing, managing, monitoring and evaluating environmental protection measures consistent with regulatory requirements, corporate commitments, best practices and public expectations. Environmental protection, management and monitoring plans will be prepared and implemented under the environmental protection framework to address environmental protection requirements in a responsible manner. Socio-economic elements will be encompassed within the Environmental Protection Programs.

The purpose of this Environmental Protection, Follow-up and Monitoring chapter is to outline how Manitoba Hydro will implement, manage and report on environmental protection measures, monitoring and other follow-up actions, as well as regulatory and policy requirements and other commitments identified in the Project EA Report. The environmental protection program was developed in accordance with Manitoba Hydro's vision, goals and environmental policies.

The Corporate Vision is:

"To be the best utility in North America with respect to safety, rates, reliability, customer satisfaction, and environmental leadership, and to always be considerate of the needs of customers, employees, and stakeholders" (Manitoba Hydro 2012).

One of the corporation's goals is "To protect the environment in everything we do," This goal can only be achieved with the full commitment of Manitoba Hydro management, employees, consultants and contractors at all project stages from planning and design through the construction and operational phases. Manitoba Hydro's Corporate Environmental Management Policy (Manitoba Hydro 2012) states that:

"Manitoba Hydro is committed to protecting the environment. In full recognition of the fact that corporate facilities and activities affect the environment, Manitoba Hydro integrates environmentally responsible practices into its business, thereby:

- *Preventing or minimizing any adverse impacts, including pollution, on the environment, and enhancing positive impacts;*
- *Continually improving our Environmental Management System;*
- *Meeting or surpassing regulatory requirements and other commitments;*

- *Considering the interests and utilizing the knowledge of our customers, employees, communities and stakeholders who may be affected by our actions;*
- *Reviewing our environmental objectives and targets annually to ensure improvement in our environmental performance; and*
- *Documenting and reporting our activities and environmental performance."*

10.2 ENVIRONMENTAL PROTECTION PLAN

10.2.1 Overview

Manitoba Hydro's Environmental Protection Program provides the framework for the delivery, management and monitoring of environmental and socio-economic protection measures that satisfy corporate policies and commitments, regulatory requirements, and environmental protection guidelines and best practices, and input from stakeholders and the Aboriginal community.

The Program describes how Manitoba Hydro is organized and functions to deliver timely, effective and comprehensive solutions and mitigation measures to address potential environmental effects. Roles and responsibilities for Manitoba Hydro employees and contractors are defined, and management, communication and reporting structures are outlined. The Environmental Protection Program includes the what, where and how aspects of protecting the environment during the pre-construction, construction, operation and decommissioning of the Project.

10.2.2 Organization

The organization structure of the Environmental Protection Program includes senior Manitoba Hydro management, and project management and implementation teams that work together to ensure timely and effective implementation of environmental protection measures identified in environmental protection plans (Figure 10.2-1).

Manitoba Hydro senior management is responsible for the overall Environmental Protection Program including resourcing, management and performance, and is accountable for regulatory compliance, policy adherence and stakeholder satisfaction. The Environmental Protection Management Team is composed of senior Manitoba Hydro staff and is responsible for the management of environmental protection plans including compliance with regulatory and other requirements, quality assurances and control, and engagement with regulators, stakeholders, local First Nations and Métis.

The management team is supported by environmental consultants and advisors. The Environmental Protection Implementation Team is composed of Manitoba Hydro operational field and office staff, and is responsible for the day-to-day implementation of environmental protection plans including monitoring, inspecting and reporting. The implementation team works closely with other Manitoba Hydro staff on an as required basis.

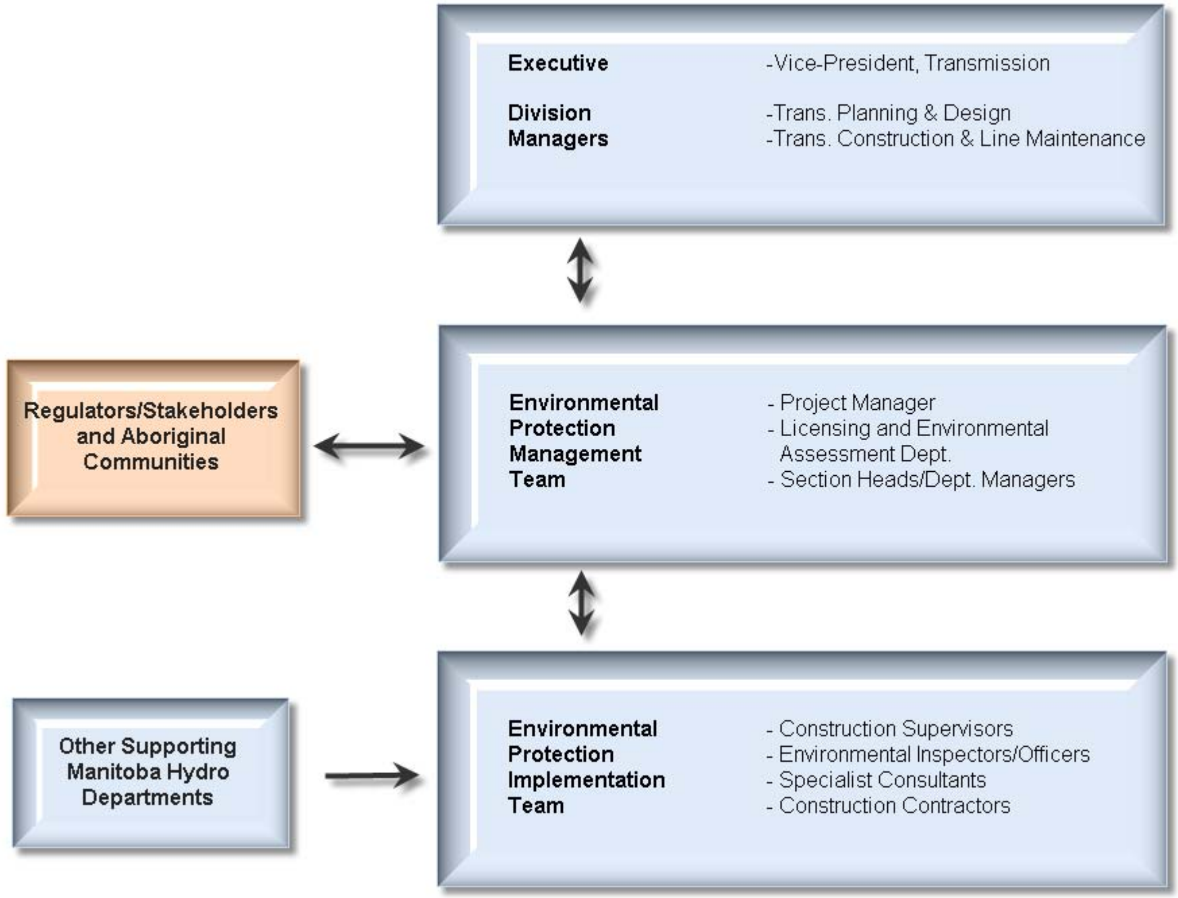


Figure 10.2-1: Environmental Protection Organizational Structure

10.2.3 Roles and Responsibilities

Roles and responsibilities for delivery of the Project and implementation of environmental protection measures are illustrated in general terms in Figure 10.2-2.

- The Construction Supervisor has overall responsibility for the implementation of the environmental protection plans and reports to a Section Head or Department Manager.
- The Senior Environmental Assessment Officer is responsible for implementation of the EnvPPs and reports to a Section Head or Department Manager.

- The Licensing and Environmental Assessment Department oversees the development of environmental protection documents, and associated inspection and monitoring programs.
- The Construction Contractor is responsible for ensuring work adheres to the environmental protection plans and reports to the Construction Supervisor/Site Manager.
- Environmental Officers/Inspectors have the primary responsibility to confirm that environmental protection measures and specifications are implemented as per the EnvPPs, as well as provide information and advice to the Construction Supervisor.
- Manitoba Hydro Field Safety, Health and Emergency Response Officers are responsible for the development and execution of the safety program, and Occupational Health and Safety practices at the various construction sites.
- Other Manitoba Hydro employees including engineers and technicians provide information and advice to the Construction Supervisor.

10.2.4 Resources

Ensuring that adequate resources are allocated to the environmental aspects of project planning, development, implementation and operation is key to successful implementation of environmental protection measures and follow-up including monitoring and other requirements. Manitoba Hydro commits resources early in the planning cycle to ensure effective environmental assessment, mitigation and monitoring. Teams of engineers and environmental professionals develop preventative or avoidance mitigation measures that include design, routing and siting alternatives.

In addition, there are resource allocations for the delivery and implementation of specific environmental protection measures to meet corporate policy and government regulatory requirements. Manitoba Hydro is committed to staffing the Environmental Protection Program with sufficient Environmental Inspectors and providing required support including training, financial resources and equipment.

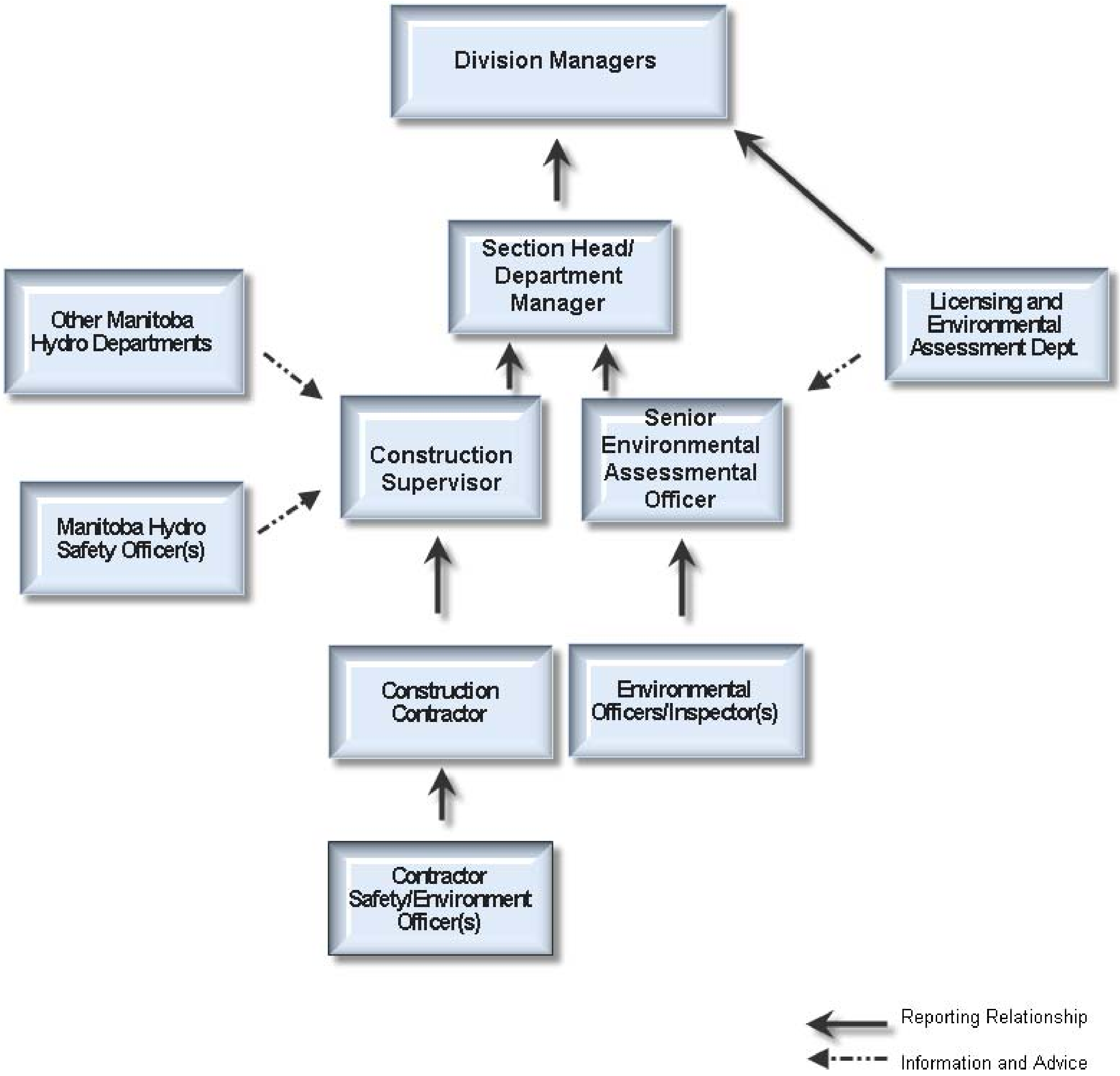


Figure 10.2-2: Typical Organizational Lines of Reporting and Communication

10.2.5 Environmental Management

Manitoba Hydro is certified under the International Standards Organization (ISO) 14001 Environmental Management System standard and is subject to requirements of the standard including annual audits to verify its environmental performance.

An Environmental Management System (EMS) is a framework for developing and applying its environmental policy and includes articulation of organizational structure, responsibilities, practices, processes and resources at all levels of the corporation. The EMS includes commitments to comply with legislation, licences, permits and guidelines, conduct inspections and monitoring, and review the results for adherence to requirements. The ISO standard ensures quality, performance and continual improvement in the delivery of Manitoba Hydro's Environmental Protection Program.

10.2.6 Environmental Protection Documents

Several environmental protection planning documents are developed for different project phases, components and activities. The documents include environmental protection, management and monitoring plans. The level of detail captured in the various plans increases as the project advances through planning, design, construction and operation phases, and the environmental assessment and licensing process (Figure 10.2-3).

Prior to the commencement of construction activities, a Construction Phase EnvPP will be prepared. The Construction Phase EnvPP will provide a high level of detail required to implement the general and specific environmental protection measures and will cover the construction period from beginning to end.

The Operation Phase EnvPP will be prepared prior to the completion of the Project and will cover the period from commissioning to the eventual decommissioning of the Project. A Decommissioning EnvPP would be prepared prior to the eventual decommissioning of the Project.

Management plans are prepared in response to specific environmental issues identified during the environmental assessment of the Project. Typical environmental issues include erosion control and emergency response. Management plans are structured documents that provide reasoned and approved courses of action to address environmental issues. Management plans are also prepared in response to regulatory requirements and responsible management practices.

Monitoring plans are prepared in response to specific follow-up requirements identified during the environmental assessment of the Project. Follow-up requirements include those actions implemented to confirm compliance with regulatory requirements and to assess the effectiveness of the environmental assessment. Example follow-up actions include invasive vegetation management, water quality protection, and the protection of fish and fish habitat.

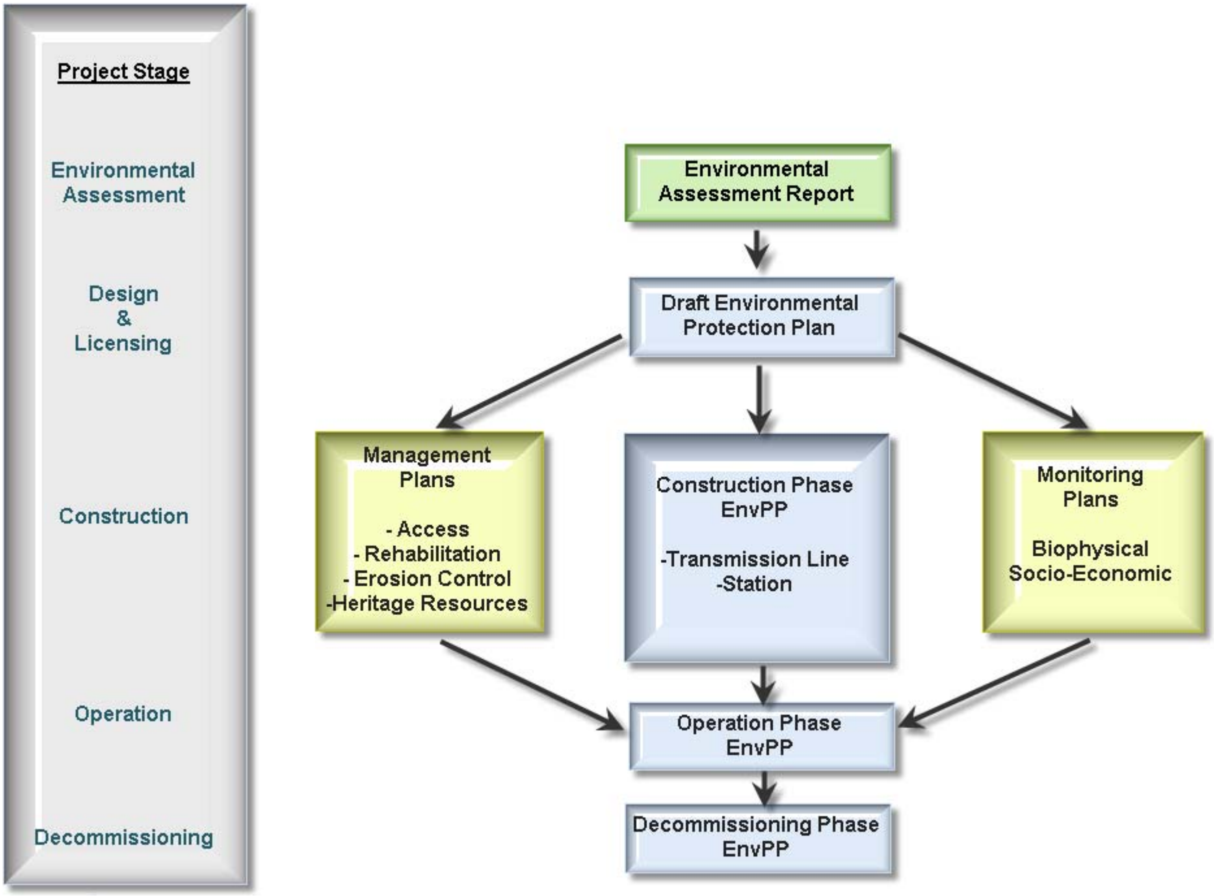


Figure 10.2-3: Typical Environmental Protection Documents

10.2.7 Pre-Construction Activities

Manitoba Hydro will obtain all licences, permits, authorizations and other approvals including property agreements, right-of-way easements and releases prior to commencement of construction of each individual project component or segment. Any additional terms and conditions of these approvals will be incorporated into the Construction Phase EnvPP. Any additional approval requirements to be obtained by the Contractors will be identified and communicated to the successful bidders. Meetings will be held with the successful contractors to review the environmental protection requirements, establish roles and responsibilities, management, monitoring and other plans, inspection and reporting requirements, and other submittals. Prior to the start of construction, contractor employees will be trained and/or oriented on environmental protection requirements. Manitoba Hydro and contract employees, project managers, consultants and others working on the Project will be required to attend orientation sessions.

10.2.8 Construction Activities

A number of activities occur during construction of the Project to implement environmental protection measures and ensure compliance with regulatory requirements. Such activities include meetings with contractors, working with regulators, inspection and compliance, work stoppage and emergency response.

The Project Manager, Construction Supervisor, Environmental Officer/Inspector, and Licensing and Environmental Assessment staff will meet with regulatory authority points of contact at the beginning of the Project to outline construction plans and schedules, and will request regular meetings to provide updates on project progress, environmental protection measure implementation and regulatory compliance.

Manitoba Hydro will fulfill all regulatory requirements for submission of inspection, monitoring and other reports. Regulators will be notified immediately in case of emergency situations, environmental accidents or other incidents in accordance with regulatory requirements. Any proposed changes or alterations to the construction project, environmental protection measures or monitoring activities will be reviewed with the appropriate regulatory authorities.

Manitoba Hydro will establish a comprehensive integrated environmental inspection program to comply with regulatory requirements, implement environmental protection measures and meet corporate environmental objectives.

10.2.9 Work Stoppage

The duty to stop work rests with everyone encountering situations where the environment, including biophysical, socio-economic and heritage resources, are threatened by an activity or occurrence that has not been previously identified, assessed and mitigated. Work stoppage is also to occur in the event of an environmental accident, extreme weather event or exposed human remains.

Individuals discovering such situations are to inform their supervisor who will report the matter to the Construction Supervisor immediately who will issue a stop work order. The Contractor is also required to stop work voluntarily where construction activities are adversely affecting the environment or where mitigation measures are not effective in controlling environmental effects.

Remedial action plans or other environmental protection measures will be developed and implemented immediately after discussion and prior to the resumption of work if previously halted. Work is not to resume until the situation has been assessed and responded to, and the Construction Supervisor approves the resumption of work. All stop work orders will be documented, reported to regulatory authorities (if applicable) and reviewed at construction meetings.

10.2.10 Emergency and Contingency Response

Spills of hazardous substances, fires and explosions, environmental accidents, heritage resource discoveries and other emergency or contingency situations require immediate action and response in accordance with established response plans. Provincial, federal and municipal authorities, and Manitoba Hydro personnel are to be notified in accordance with regulations, and emergency and contingency response plans.

These plans provide names of emergency responders, up to date contact information and notification procedures. Contractors are also required to have emergency response plans outlining contacts and response measures to exigent situations including hazardous materials spills, heritage resource discoveries, environmental accidents and fires or explosions. Manitoba Hydro has emergency response coordinators to deal with spills of hazardous and other substances.

10.2.11 Tools and Resources

An Environmental Protection Information Management System (EPIMS) has been developed as a central repository of environmental protection information including but not limited to:

- Environmental protection documents
- Reference information such as regulations and guidelines
- Daily, weekly and monthly inspection reports
- Environmental incident reports
- Monitoring program field data and reports

The environmental inspection program will employ modern electronic recording, reporting and communications systems using field computers, geographic positioning systems and digital cameras. Electronic forms will be transferable to supervisors and project managers thereby enabling rapid communication and response to emerging situations. Field computers will have project and other reference information needed for effective implementation of environmental protection measures including regulations, licences, permits, engineering drawings, specifications, maps, reports and data.

The EPIMS will monitor and report on environmental protection implementation, regulatory compliance and incident reporting. The EPIMS will be the mechanism to provide reporting and tracking of environmental protection performance, and the foundation of an auditable environmental protection program.

Manitoba Hydro personnel will maintain ongoing communications with Manitoba Conservation and Water Stewardship, other provincial and federal government departments, and local First Nations and the MMF, as necessary, regarding implementation of the Project EnvPP. The Construction Supervisor/Site Manager and Environmental Officers/Inspectors will maintain ongoing communications with the Contractor and contract staff through daily tailboard meetings and weekly or otherwise scheduled construction meetings at the worksite.

10.3 ENVIRONMENTAL PROTECTION PLAN

10.3.1 Overview

EnvPP’s are the main implementation instrument under the EPP. A Construction EnvPP (CEnvPP) will be developed subsequent to licensing and prior to construction. The CEnvPP will document the environmental protection measures to provide for compliance with regulatory and other requirements, and to achieve environmental protection goals consistent with corporate environmental policies.

Manitoba Hydro’s environmental protection plans are designed as “user-friendly” reference documents that provide project managers, construction supervisors and contractors with detailed lists of environmental protection measures and other requirements to be implemented in the design, construction and operation phases of a project. Environmental protection measures are organized by construction component and activity, and environmental component and issue to assist project personnel in implementing measures for specific work sites and activities.

The CEnvPP is a key element in implementing effective environmental protection and minimizing the potential adverse environmental effects identified in the EA Report. It also outlines actions to identify unforeseen environmental effects and to implement adaptive management strategies to address them. An important component of an CEnvPP is monitoring and updating which serves to ensure that environmental protection measures remain current and to provide for continual improvement of environmental performance.

10.3.2 General Environmental Protection Measures

General environmental protection measures for the Project include mitigation measures and follow-up actions identified in the EA Report including design mitigation, provincial and federal regulatory requirements, best practice guidelines, Manitoba Hydro environmental policies and commitments, and input from stakeholders, Aboriginal communities and the general public.

10.3.3 Timing Windows

10.3.3.1 General

Construction will be carried out during winter months (November to March) under frozen and snow-covered conditions where required, and under conditions during other times of the year that minimize excessive soil disturbance.

10.3.3.2 Wildlife Reduced Risk Work Windows

Table 10.3-1 outlines wildlife reduced risk work windows applicable to the Project. These windows are based on federal and provincial regulatory requirements as well as best management practices. Timing periods may be expanded or refined based on further data collection, transmission line final design and regulatory licence and work permits to be issued for the project.

The recommended reduced risk work windows are considerate of periods of the year when wildlife species are sensitive to disruptive operations because of a sensitive lifecycle activity such as calving, nesting, and hibernation, etc. Table 10.3-1 is intended to assist in scheduling construction activities for the time of year when risks of adverse construction impacts are negligible. Where conflicting timing restraints with construction activities exist in a particular area, appropriate mitigation will be implemented to reduce effects. These timing windows have been appended to environmentally sensitive sites (ESS) in the Construction EnvPP.

10.3.3.3 Burning

Burning will be authorized between October 1st and November 15th by a burning permit. Burning between November 16th and March 31st does not require a burning permit; however, the supervising Natural Resources Officer must be advised prior to any burning. All fires must be completely extinguished by March 31st.

Table 10.3-1 Wildlife Reduced Risk Timing Windows

Species	Sensitivity	January		Febuary		March		April		May		June		July		August		September		October		November		December	
Mammals	Overwinter Den Sites	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟥	🟥	🟥	🟥	🟥	🟥
Moose/Elk	Calving Sites	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟥	🟥	🟥	🟥	🟥	🟥	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩
Caribou	Calving Sites	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟥	🟥	🟥	🟥	🟥	🟥	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩
Amphibians/Reptiles	Breeding and Emergence	🟩	🟩	🟩	🟩	🟩	🟩	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩
Bats	Hibernaculum	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟩	🟩	🟩	🟩	🟩	🟩	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥
Birds	Breeding and Nesting	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟥	🟥	🟥	🟥	🟥	🟥	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩

🟩 Reduced Risk to Wildlife
🟥 Sensitive Time Period for Wildlife
(Where construction activities occur during this
period, mitigations measures will be prescribed
on a site by site basis)

10.3.3.4 Fish

Fish habitat can be adversely affected by in-stream work that occurs during certain periods in their life history or at certain life stages. Life history periods or life stages susceptible to disturbances from instream construction work include the following:

- Spawning and egg incubation
- Movements to or from spawning or overwintering areas
- Egg and newly hatched fry

Timing works to avoid sensitive life history periods or life stages is an effective means of mitigating adverse effects. All in-stream activities should be conducted during a timing window of at least risk to fish and fish habitat. Table 10.3-2 below contains general recommended timing windows to avoid during construction.

Where applicable, site specific timing windows are prescribed in specific mitigation measures for each feature.

Table 10.3-2: Timing Windows for No In-water Work to Occur

Region	Spring Spawning Fish	Summer Spawning Fish	Fall Spawning Fish
Project Study Area	April 1-June 15	May 1-June 30	September 15-April 30

*Department of Fisheries and Oceans, Manitoba Operational Statement Timing Windows (2007)

10.3.4 Buffers and Setbacks

10.3.4.1 Setbacks and Buffers for Wildlife and Anthropogenic Features

Recommended setbacks and buffer distances from sensitive environmental features are provided in Table 10.3-3. These will be applied to environmentally sensitive sites (ESS) in the EnvPP.

These setbacks and buffers are preliminary and may be expanded or refined based on further data collection, transmission line final design, regulatory licence and work permits to be issued for the project.

Setbacks are areas to be maintained from a given environmental feature where no work shall occur. Buffers are work areas where restricted activities such as low disturbance clearing are permitted. Where applicable, site specific setback and buffers are prescribed in specific mitigation measures for each feature.

10.3.4.2 Riparian Management

Recommended Setbacks, Riparian Buffers and Machine Free zones distances from sensitive water features are provided in Tables 10.3-3 and 10.3-4. These will be applied to environmentally sensitive sites in the appropriate EnvPP.

Setbacks to be maintained from a defined riparian habitat where no work shall occur.

Riparian Buffers are applied to riparian habitats within the ROW that in which all shrub and herbaceous vegetation will be retained and all trees that do not violate Manitoba Hydro vegetation clearance requirements will be retained.

Machine free zones are work areas where restricted activities such as low disturbance clearing are permitted by reaching into zone with equipment but not entering the zone.

Both Riparian Buffers and Machine Free Zones are measured from the ordinary high water mark (OHWM) and apply to streams that are identified as ESS sites. Setbacks are measured from OHWM or from a defined riparian boundary.

Where applicable, site specific setbacks are prescribed in specific mitigation measures for each feature.

Table 10.3 - 3 Setbacks and Buffers

Feature	**Activity**	**Non Frozen Ground Setback Distance (No work allowed)**	**Frozen Ground Setback Distance (No work allowed)**	**Vegetated Buffer Distance (Shrub and Herbaceous Vegetation Retained)**	**Effective Period**	**Rationale**
Vegetation						
Plant Species at Risk	Tower Foundation Siting	100m	100m			Protect from disturbance
	Clearing And Construction	30m		30m		Protect from disturbance
	Maintenance	30m		30m		Protect from disturbance
	Access Trail	30m	30m			Protect from disturbance
Anthropogenic						
Recreational and Commercial Lots	All	50-200m	50-200m			Visual and aesthetic screening
Trapper's Cabins (Away from water)	All	50-200m	50-200m			Visual and aesthetic screening
Research and Permanent Sample Plots	All	100m	100m			Maintain integrity of research
Heritage and Cultural	All	Varies	Varies	Varies		Protect from Disturbance
Designated Recreational Trails	All	0-50m				Visual and aesthetic screening
Amphibians						
Northern Leopard Frog * (known breeding pond, watering site)	Tower Foundation Siting	30m	30m			Protect from disturbance
	Clearing And Construction	30m		30m		Protect from disturbance
	Maintenance	30m				Protect from disturbance
	Access Trail	30m	30m			Protect from disturbance
Plains Spadefoot Toad ** (known breeding, living, hibernating ponds)	Tower Foundation Siting	30m	30m			Protect from disturbance
	Clearing And Construction	30m		30m		Protect from disturbance
	Maintenance	30m				Protect from disturbance
	Access Trail	30m	30m			Protect from disturbance
Reptiles						

Table 10.3 - 3 Setbacks and Buffers

Feature	**Activity**	**Non Frozen Ground Setback Distance (No work allowed)**	**Frozen Ground Setback Distance (No work allowed)**	**Vegetated Buffer Distance (Shrub and Herbaceous Vegetation Retained)**	**Effective Period**	**Rationale**
Garter Snake Hibernaculum	Tower Foundation Siting	200m	200m			Protect from disturbance
	Clearing And Construction	200m		200m		Protect from disturbance
	Maintenance	200m		200m		Protect from disturbance
	Access Trail	200m				Protect from disturbance
Northern Prairie Skink (burrow)	Tower Foundation Siting	200m	200m			Protect from disturbance
	Clearing And Construction	100m		100m		Protect from disturbance
	Maintenance	100m		100m		Protect from disturbance
	Access Trail	100m	100m			Protect from disturbance
Birds - Breeding and Nesting Sites						
Nests of Eagles, Ospreys and Heron Rookeries	All	200m			April 1 to July 31	Protect from sensory disturbance during breeding season.
Active Large Stick Nests	All	200m			April 1 to July 31	Protect from sensory disturbance during breeding season.
Least Bittern	All	400m			May 15 to July 31	Protect from sensory disturbance during breeding season.
Yellow Rail	All	350m			May 15 to July 31	Protect from sensory disturbance during breeding season.
Burrowing Owl	All	500m			April 15 to Sept 15	Protect from sensory disturbance during breeding season.
Short Eared Owl	All	500m			April 15 to Sept 15	Protect from sensory disturbance during breeding season.
Common Nighthawk	All	200m			June 1st to July 15	Protect from sensory disturbance during breeding season.
Ferringeous Hawk	All	1000m			March 20 to July 15	Protect from sensory disturbance during breeding season.
Golden Winged Warbler	All	300m			May 15 to July 15	Protect from sensory disturbance during breeding season.

Table 10.3 - 3 Setbacks and Buffers

Feature	Activity	Non Frozen Ground Setback Distance (No work allowed)	Frozen Ground Setback Distance (No work allowed)	Vegetated Buffer Distance (Shrub and Herbaceous Vegetation Retained)	Effective Period	Rationale
Loggerhead Shrike	All	400m			April 20 to July 15	Protect from sensory disturbance during breeding season.
Red Headed Woodpecker	All	200m			May 15 to July 31	Protect from sensory disturbance during breeding season.
Rusty Blackbird	All	100m			May 20 to July 10	Protect from sensory disturbance during breeding season.
Olive-sided flycatcher	All	300m			May 15 to July 15	Protect from sensory disturbance during breeding season.
Sprague's Pipit	All	250m			May 15 to July 15	Protect from sensory disturbance during breeding season.
Whip-poor-will	All	200m			May 15 to July 15	Protect from sensory disturbance during breeding season.
Sharp tailed Grouse Leks	All	400m			March 15 to June 1	Protect from sensory disturbance during breeding season.
Canada Warbler	All	300m			May 20 to July 31	Protect from sensory disturbance during breeding season.
Nesting Colonies	All	1000m			April 1 to July 31	Protect from sensory disturbance during breeding season.
Landforms						
Wetlands	Clearing And Construction	30m		30m		Protect from disturbance
	Maintenance	30m		30m		Protect from disturbance
	Access Trail	30m		30m		Protect from disturbance
	Hazardous Material Handling/Storage	100m	100m			Protect from disturbance
	Soil Stockpiles	30m		30m		Protect from disturbance
Unique Soil/Terrain Features	All Off ROW activities	100m				Protect from disturbance
Steep or Unstable Slopes	Establishment or use of borrow pits	100m	100m			Protect from disturbance

Table 10.3-3 Setbacks and Buffers

Feature	Activity	Non Frozen Ground Setback Distance (No work allowed)	Frozen Ground Setback Distance (No work allowed)	Vegetated Buffer Distance (Shrub and Herbaceous Vegetation Retained)	Effective Period	Rationale
Mammals						
Mineral Licks	All	120m		120m		Protect from disturbance
Occupied Mammal Dens	All	50m	50m			Protect from disturbance
Invertebrates						
Ottoe and Uncas Skippers	All			30m		Protect habitat

All measurements are from edge of feature

Table 10.3 - 4 Riparian Setbacks, Buffers and Zones

Feature	**Activity**	**Setback (No work allowed)**	**Riparian Buffer**	**Machine Free Zone (No machines allowed except at trail crossing)**	**Rationale**
Wetland/Lake/River/Creek/Stream					
Waterbodies/Fish Habitat Outside ROW	Clearing and Construction	15-30m			Protect from sedimentation and erosion
	Maintenance	15-30m			Protect from sedimentation and erosion
	Access Trail	15-30m			Protect from sedimentation and erosion
Waterbodies/Fish Habitat Inside ROW	Tower Foundation Siting	15-30m			Protect from sedimentation and erosion
	Clearing and Construction		30m	7m	Protect from sedimentation and erosion
	Maintenance		30m	7m	Protect from sedimentation and erosion

All zones and buffers are measured from Ordinary High Water Mark or defined riparian area by Aquatic specialist

10.3.5 General Mitigation Tables

Access Roads and Trails (PC-1)

ID	Mitigation
PC-1.01	Access roads and trails no longer required will be decommissioned and rehabilitated in accordance with the Rehabilitation and Vegetation Management Plan.
PC-1.02	Access roads and trails required for future monitoring, inspection or maintenance will be maintained in accordance with the Access Management Plan.
PC-1.03	Access roads and trails will be constructed to a minimum length and width to accommodate the safe movement of construction equipment
PC-1.04	Access roads and trails will be located, constructed, operated and decommissioned in accordance with contract specifications.
PC-1.05	Access roads and trails will be provided with erosion protection and sediment control measures in accordance with the Erosion Protection and Sediment Control Plan.
PC-1.06	All season access roads will not be permitted within established buffer zones and setback distances from waterbodies, wetlands, riparian areas and water bird habitats.
PC-1.07	Approach grades to waterbodies will be minimized to limit disturbance to riparian areas.
PC-1.08	Bypass trails, sensitive sites and buffer areas will be clearly marked prior to clearing, to identify that prescribed selective clearing is to occur as per Map Sheets.
PC-1.09	Contractor will be restricted to established roads and trails, and cleared construction areas in accordance with the Access Management Plan.
PC-1.10	During winter construction, where necessary (i.e. unfrozen wetlands, creeks), equipment will be wide-tracked or equipped with high flotation tires to minimize rutting and limit damage and compaction to surface soils.
PC-1.11	Equipment, machinery and vehicles will only travel on cleared access roads and trails, and will cross waterways at established temporary and permanent crossings.
PC-1.12	Existing access roads, trails or cut lines will be used to the extent possible. Permission to use existing resource roads (ie forestry roads (North/South Jonas roads) will be obtained.
PC-1.13	MCWS Work Permits will be obtained prior to the commencement of the project.
PC-1.14	No chemical melting agents are to be utilized.
PC-1.15	Only water and approved dust suppression products will be used to control dust on access roads where required. Oil or petroleum products will not be used.
PC-1.16	Public use of decommissioned access routes will be controlled through the Access Management Plan.
PC-1.17	Public use of project controlled access roads and trails during construction will be controlled through the Access Management Plans.

Access Roads and Trails (PC-1)

PC-1.18	Routing for access roads and trails should follow natural terrain contours to the extent possible and should be minimized adjacent to and approaching waterbodies.
PC-1.19	Surface water runoff will be directed away from disturbed and erosion prone areas but not directly into waterbodies.
PC-1.20	Vegetation control along access roads and trails will be in accordance with Rehabilitation and Vegetation Management Plan.

Agricultural Areas (EC-1)

ID	Mitigation
EC-1.01	All fences and gates will be left in "as-found" condition.
EC-1.02	Any necessary access on agricultural lands will be discussed in advance with the landowner.
EC-1.03	Construction areas and sites will be assessed for compaction and if required will be deep ploughed by the contractor to mitigate any compaction prior to returning them to agricultural use.
EC-1.04	Erosion protection and sediment control measures will be established before construction work commences in agricultural areas where necessary.
EC-1.05	Excess construction materials (i.e. waste, granular fill; clay) will be removed from construction sites and areas located on agricultural lands. Area will be restored to pre-existing conditions.
EC-1.06	Existing access to agricultural lands will be utilized to the extent possible.
EC-1.07	Required travel off existing roads will be minimized and restricted to previously designated and approved routes.
EC-1.08	Vehicular travel on agricultural lands will follow existing roads, trails and paths to the extent possible.

Aircraft Use (EI-1)

ID	Mitigation
EI-1.01	Contractors using aircraft will submit flight plans in advance of flying to the Resident Engineer / Manager during active construction periods.
EI-1.02	Fuel storage, handling and dispensing at aircraft landing areas will conform to provincial legislation and guidelines.

Blasting and Exploding (PA-1)

ID	Mitigation
PA-1.01	A communication protocol will be developed to notify affected parties of blasting operations and conductor splicing. Affected parties may include Manitoba Conservation and Water Stewardship, RCMP, municipalities, landowners, and resource users.
PA-1.02	Blasting will be conducted and monitored in accordance with Fisheries and Oceans Canada Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters
PA-1.04	Blasting will not be permitted during timing windows established for sensitive bird breeding, nesting and brood rearing months.
PA-1.05	Explosives will be stored, transported and handled in accordance with federal requirements through the Explosives Act and Transportation of Dangerous Goods Act and provincial regulations stated in The Workplace Safety and Health Act.
PA-1.06	Implode Compression conductor splicing will be minimized to extent possible on weekends and after normal working hours in residential areas
PA-1.07	Quarry blasting operations and conductor splicing will be scheduled to minimize disturbance to wildlife and area residents, and to ensure the safety of workers.
PA-1.08	The Blasting Contractor will be in possession of valid licenses, permits and certificates required for blasting in Manitoba.
PA-1.09	The Blasting Contractor will submit a Blasting Plan to the Construction Supervisor for review and approval prior to commencement of blasting operations.
PA-1.10	Use of ammonium nitrate and fuel oil will not be permitted in or near waterways.
PA-1.11	Warning signals will be used to warn all project personnel and the public of safety hazards associated with blasting.
PA-1.12	Written and/or oral notification will be outlined in the Communication Plan prior to each blasting period.

Borrow Pits and Quarries (PC-2)

ID	Mitigation
PC-2.01	Access to abandoned borrow pits and quarries will be managed in accordance with the Access Management Plan.
PC-2.02	All equipment and structures will be removed from borrow pits prior to abandonment.
PC-2.03	Borrow pits and quarries will be designed, constructed and operated in compliance with provincial legislation and guidelines.
PC-2.04	Borrow pits and quarries will not be located within 150 m of a provincial trunk highway or provincial road unless an effective vegetated berm is provided to shield the area from view.
PC-2.05	Borrow pits and quarries will not be located within established buffer zones and setback distances from identified Environmentally Sensitive Sites.
PC-2.06	Drainage water from borrow pits and quarries will be diverted through vegetated areas, existing drainage ditch(s) or employ a means of sediment control prior to entering a waterbody.
PC-2.07	Erosion protection and sediment controls will be put in place before borrow pit excavation commences, when required as determined by the Environmental Inspector.
PC-2.08	Fuel storage will not be permitted near stockpiles outlined in PC 5.21.
PC-2.09	Garbage, debris or refuse will not be discarded into borrow pits and quarries.
PC-2.10	Only water and approved dust suppression products will be used to control dust on access roads where required. Oil or petroleum products will not be used.
PC-2.11	Organic material, topsoil and subsoil with-in borrow pits and quarries will be stripped and stockpiled for use in future site rehabilitation
PC-2.12	Previously developed borrow sites and quarries will be used to the extent possible before any new sites are developed.
PC-2.13	Signs will be posted at borrow pits and quarries to warn all persons of safety hazards.
PC-2.14	Surface drainage will be redirected away from the borrow pits and quarries before excavation commences.
PC-2.15	Vegetated buffer areas will be left in place when borrow pits are cleared in accordance with provincial guidelines.
PC-2.16	Vegetation control at borrow pits and quarries will be in accordance with the Vegetation Management Plan.
PC-2.17	Vegetation in active Manitoba Hydro permitted borrow pits and quarries will be maintained as per the Rehabilitation/ and Vegetation Management Plan
PC-2.18	Worked out borrow pits and granular quarries will be left with maximum 4:1 (horizontal to vertical) side slopes.

Built-up and Populated Areas (EC-2)

ID	Mitigation
EC-2.01	Construction activities and equipment will be managed to avoid damage and disturbance to adjacent properties, structures and operations.
EC-2.02	Mud, dust and vehicle emissions will be managed in a manner that ensures safe and continuous public activities near construction sites where applicable.
EC-2.03	Noisy construction activities where noise and vibration may cause disturbance and stress in built-up areas will be limited to daylight hours.

Burning (PA-2)

ID	Mitigation
PA-2.01	All occurrences of fire spreading beyond the debris pile will be reported immediately in accordance with work permit conditions
PA-2.02	Any residue or unburned materials remaining post-burn is not to encumber operations or re-vegetating activities.
PA-2.03	Burning of slash on permafrost soils should be avoided. If it is unavoidable, the utilization of other methods such as a metal container that can be removed from site.
PA-2.04	Burning of solid wastes including kitchen wastes and treated wood will not be permitted.
PA-2.05	Burning will be monitored to ensure that fires are contained and subsequent fire hazards are not present. Post season all burn piles will be scanned for hot spots using infrared scanning technology
PA-2.06	Burning will not be carried out within riparian buffer zones or setbacks for stream crossings or waterbodies.
PA-2.07	Burning will only be carried out in accordance with provincial work permits. A Burning Permit is required between April 1st and November 15.
PA-2.08	Debris and wood chip piles located near habitation or highways will only be burned when weather conditions are favorable to ensure the safe dispersal of smoke and in accordance with burning permits where applicable.
PA-2.09	Debris piles scheduled for burning will be piled on mineral soils where possible.
PA-2.10	Firefighting equipment required by legislation, guidelines and contract specifications will be kept on site and maintained in serviceable condition during burning.
PA-2.11	Slash will be piled in a manner that allows for clean, efficient burning of all material and on mineral soils where applicable (ie permafrost).

Clearing (PA-3)

ID	Mitigation
PA-3.01	Riparian Buffers shall be a minimum of 30m and increase in size based on slope of land entering waterway. (See Riparian Buffer Table in CEnvPP) Within these buffers shrub and herbaceous understory vegetation will be maintained along with trees that do not violate Manitoba Hydro Vegetation Clearance Requirements.
PA-3.02	Access to clearing areas will utilize existing roads and trails to the extent possible.
PA-3.03	All clearing and construction equipment is to remain within the bounds of access routes and the Project footprint identified.
PA-3.04	Areas identified for selective clearing (e.g., buffer zones, sensitive sites) will be flagged prior to clearing.
PA-3.05	Chipped or mulched material may be collected for use in construction areas and sediment/erosion control.
PA-3.07	Cleared trees and woody debris will not be pushed into or adjacent to standing timber, wetlands or waterbodies.
PA-3.08	Clearing activities will be carried out in accordance with contract specifications
PA-3.09	Clearing and disturbance and equipment use will be limited to the project footprint and associated access routes.
PA-3.10	Clearing will not be permitted within established setbacks for bird nesting and rearing during established timing windows.
PA-3.11	Clearing within environmentally sensitive areas, not designated for organic removal will be carried out in a manner that minimizes disturbance to existing organic soil layer.
PA-3.12	Construction vehicles where possible will be wide-tracked or equipped with high floatation tires to minimize rutting and limit damage and compaction to surface soils.
PA-3.13	Construction vehicles, machinery and heavy equipment will not be permitted in designated machine-free zones except at designated crossings.
PA-3.14	Danger trees will be flagged/marked for removal using methods that do not damage soils and adjacent vegetation.
PA-3.15	Environmentally sensitive sites, along the right-of-way will be clearly identified by signage.
PA-3.16	In locations where grubbing and vegetation stripping is not required, existing low growth vegetation such as grasses, forbs and shrubs will be maintained to the extent possible; disturbance to roots and adjacent soils will be minimized.
PA-3.17	Machine clearing will remove trees and brush with minimal disturbance to existing organic soil layer using only "V" or "K-G" type blades, feller-bunchers and other means approved by the Construction Supervisor.
PA-3.18	Property limits, right-of-way boundaries, buffers and sensitive areas (where applicable) will be clearly marked with stakes and/or flagging tape prior to clearing.
PA-3.19	Selective clearing will be carried out in erosion prone areas. Low ground disturbance methods will be employed to minimize soil disturbance.
PA-3.20	Slash piles will be placed at least 15 m from forest stands.
PA-3.21	Slash piles will not be placed on the surface of frozen waterbodies and will not be located within established setbacks from waterbodies or within the ordinary high water mark.

Clearing (PA-3)

PA-3.22	The Construction Supervisor will issue a stop work order if extreme wet weather or insufficient frost conditions results in soil damage from rutting, and soil erosion is resulting in sedimentation of adjacent waterbodies.
PA-3.23	Trees containing active nests and areas where active animal dens or burrows are encountered will be left undisturbed until unoccupied.
PA-3.24	Trees will be felled toward the middle of rights-of-way or cleared area to avoid damage to standing trees. Trees will not be felled into waterbodies.
PA-3.25	Vegetation will be removed by mechanical means except where other selective clearing methods are stipulated at identified Environmentally Sensitive Sites.
PA-3.26	Where practical, merchantable timber will be salvaged and brought to market. As per Annual Harvest Plan, timber that is not salvaged will be piled and burned during frozen conditions in accordance with timing windows.

Demobilizing and Cleaning Up (PA-4)

ID	Mitigation
PA-4.01	Buildings, structures, trailers, equipment, utilities, waste materials, etc will be removed from construction areas and sites when work is completed.
PA-4.02	Construction access roads/trails that are no longer required will be decommissioned and rehabilitated to prevent access.
PA-4.03	Construction areas and sites will be rehabilitated and re-vegetated as appropriate immediately after demobilizing and clean-up.
PA-4.04	Construction areas no longer required will be demobilized and rehabilitated in accordance with Rehabilitation and Vegetation Management Plan and/or provincial regulations (ie quarries and borrow sites)
PA-4.05	Petroleum product and other hazardous substances storage areas will be cleaned up, assessed and, if necessary, remediated in accordance with provincial guidelines and Manitoba Hydro guidelines.
PA-4.06	Stream crossings and drainages will be left free of obstructions so as not to impede natural runoff.

Draining (PA-5)

ID	Mitigation
PA-5.01	Blockage of natural drainage patterns by construction activities will be avoided.
PA-5.02	Culverts will be installed and maintained in accordance with Manitoba Stream Crossing Guidelines and DFO Operation Statement on Culvert Maintenance.
PA-5.03	Dewatering discharges will be directed into vegetated areas, existing drainage ditch(s) or a means of sediment control at such a rate and will have adequate flow dissipation at the outlet to ensure it does not cause erosion at the discharge point or at any point downstream
PA-5.04	Drainage water from construction areas will be diverted through vegetated areas, existing drainage ditch(s) or a means of sediment control prior to entering a waterbody.
PA-5.05	Erosion protection and sediment control will be provided in accordance with the Erosion Protection and Sediment Control Plan.
PA-5.06	Existing, natural drainage patterns and flows will be maintained to the extent possible.
PA-5.07	No debris or slash is allowed to be placed in drainage channels/ditches

Drilling (PA-6)

ID	Mitigation
PA-6.01	Abandoned drill holes will be sealed with bentonite or other effective sealers to prevent interconnection and cross-contamination of ground and surface waters.
PA-6.02	Drilling activities in northern Manitoba will be carried out under frozen ground conditions to minimize damage to surface vegetation, soils and permafrost to the extent possible.
PA-6.03	Drilling equipment and machinery will not be serviced within 100 m of waterbodies or riparian areas.
PA-6.04	Drilling fluids and waste materials will not be allowed to drain into waterbodies, riparian areas or wetlands.
PA-6.05	Drilling in environmentally sensitive sites, features and areas will not be permitted unless approved in advance by Environmental Inspector and mitigation measures are implemented.
PA-6.06	Drilling will not be permitted during established timing windows for caribou calving areas.
PA-6.07	Drilling will not be permitted within established buffer zones and setback distances from waterbodies.
PA-6.08	Spill control and clean-up equipment will be provided at all drilling locations.
PA-6.09	The drilling contractor will ensure that equipment and materials are available on site for sealing drill holes.
PA-6.10	The drilling contractor will inspect drilling equipment and machinery for fuel and oil leaks prior to arrival at the project site, and will inspect for fuel and oil leaks and spills regularly.
PA-6.11	Where there is potential for mixing of surface and ground water, precautions will be taken to prevent the interconnection of these waters.

Emergency Response (EI-2)

ID	Mitigation
EI-2.01	All fires will be reported in accordance with fire reporting procedures in the Emergency Preparedness and Response Plan.
EI-2.02	All spills at construction sites will be reported in accordance with provincial legislation and guidelines , and Manitoba Hydro Guidelines.
EI-2.03	All vehicles hauling petroleum products will carry spill containment and clean-up equipment.
EI-2.04	Clean-up and the disposal of contaminated materials will be managed in accordance with provincial guidelines and Manitoba Hydro guidelines.
EI-2.05	Emergency Preparedness and Response Plans and procedures will be communicated to all project staff and a copy will be made available at the project site.
EI-2.06	Emergency spill response and clean-up materials and equipment will be available at construction sites, marshalling yards, fuel storage facilities and standby locations.
EI-2.07	Fire extinguishers will be mounted on buildings at locations where they will be most readily accessible. Safety Officers will conduct annual inspections of fire extinguishers.
EI-2.08	Orientation for Contractor and Manitoba Hydro employees working in construction areas will include emergency response awareness.
EI-2.09	Post audit assessments will be carried out for all major spills and fires reported to ensure that procedures are followed and plans remain effective.
EI-2.10	Project emergency response and evacuation procedures in the Emergency Preparedness and Response Plan will be adhered to in the event of forest fires.
EI-2.11	Reasonable precautions will be taken to prevent fuel, lubricant, fluids or other products from being spilled during equipment operation, fuelling and servicing.
EI-2.12	Spill response and clean-up equipment will be capable of containing and recovering the largest release possible and be suitable for the site location.
EI-2.13	Temporary construction camps will have a designated fire marshal in accordance with the Emergency Preparedness and Response Plan.
EI-2.14	The Emergency Preparedness and Response Plan will be prepared by the Contractor, approved by the Construction Supervisor/Site Manager prior to construction and updated annually.
EI-2.15	The Manitoba Hydro hazardous materials incident report form will be completed when reporting a spill.
EI-2.16	The on-site Emergency Spill Response Coordinator will be notified of hazardous substance releases immediately in accordance with the Emergency Preparedness and Response Plan.

Erosion Protection and Sediment Control (EI-3)

ID	Mitigation
EI-3.01	Accumulated sediment will be removed from silt fences and other barriers in accordance with the Erosion Protection and Sediment Control Plan to ensure proper functioning.
EI-3.02	Construction activities will be suspended during extreme wet weather events where erosion protection and sediment control measures are compromised.
EI-3.03	Contractor specific Erosion Protection and Sediment Control Plans will be prepared by the Contractor, accepted by Manitoba Hydro prior to construction and updated annually.
EI-3.04	Erosion protection and sediment control installations will only be removed after disturbed areas are protected and sediments are disposed of in accordance with Erosion Protection and Sediment Control Plan.
EI-3.05	Erosion protection and sediment control measures will be left in place and maintained until either natural vegetation or permanent measures are established.
EI-3.06	Erosion protection and sediment control measures will be put in place prior to commencement of construction activities and will remain intact for the duration of the project.
EI-3.07	Orientation for Contractor and Manitoba Hydro employees working in construction areas will include erosion protection and sediment control techniques and procedures.
EI-3.08	The Contractor will be responsible for developing, implementing and maintaining Erosion Protection and Sediment Control Plans and procedures be put in place prior to commencement of construction activities.
EI-3.09	The Contractor will be responsible for modifying erosion protection and sediment control installations to ensure continued effectiveness.
EI-3.10	The Contractor will communicate erosion protection and sediment control information to all project staff and a copy will be made available at the project site.
EI-3.11	The Environmental Inspector will make regular inspections of erosion protection and sediment control measures to confirm implementation and continued effectiveness.

Fish Protection (EC-3)

ID	Mitigation
EC-3.01	Construction activities will not be carried out within established buffer zones and setback distances from waterbodies, wetlands and riparian areas without prior written notification of Department of Fisheries and Oceans.
EC-3.02	Disturbances to waterbodies, shorelines, riparian areas, etc. will be rehabilitated immediately upon completion of construction activities.
EC-3.03	Erosion protection and sediment control measures will be put in place at all project locations where surface drainage is likely to flow into fish bearing waters.
EC-3.04	Fish and fish habitat will be protected in accordance with federal legislation and federal and provincial guidelines.
EC-3.05	MCWS and Fisheries and Oceans Canada (DFO) will be notified if beaver dams must be cleared along rights-of-ways and along access roads and trails. Clearing of dams will be carried out in accordance of the Fisheries and Oceans Canada Operational Statement
EC-3.06	Project personnel will be prohibited from fishing at project locations or along rights-of-way

Grading (PA-7)

ID	Mitigation
PA-7.01	A thick gravel layer (1.2 m) or compacted snow layer (0.6 m) will be used in temporary workspaces or marshalling yards located in permafrost areas where required to prevent damage to surface materials.
PA-7.02	Grading for gravel pads for construction areas and access roads will be limited to areas where it is needed for the safe and efficient operation of vehicles, machinery and construction equipment.
PA-7.03	Grading for site rehabilitation and restoration will be in accordance with Rehabilitation and Vegetation Management Plan.
PA-7.04	Grading will not be permitted within established buffer zones and setback distances from waterbodies.
PA-7.05	Grading will only be permitted within rights-of-ways and construction areas.
PA-7.06	Gravel pads will be graded so the surface runoff is directed away from waterbodies, riparian areas and wetlands.
PA-7.07	Required erosion protection and sediment control measures will be put in place prior to grading in accordance with the Erosion Protection and Sediment Control Plan.

Groundwater (EC-4)

ID	Mitigation
EC-4.01	Potable water samples will be collected every two weeks and submitted for analysis according to provincial sampling and analysis protocol.
EC-4.02	Well location will be marked with flagging tape prior to construction.
EC-4.03	Where there is potential for mixing of surface and ground water, precautions will be taken to prevent the interconnection of these waters.

Grubbing (PA-8)

ID	Mitigation
PA-8.01	Construction areas containing soil with high silt content, artesian springs or areas of previous erosion will receive special erosion protection and sediment control techniques.
PA-8.02	Construction areas requiring extensive grubbing will be stabilized as soon as possible to minimize erosion.
PA-8.03	Grubbing will be halted during heavy precipitation events when working in areas of finely textured soils.
PA-8.04	Grubbing will not be permitted within 2 m of standing timber to prevent damage to root systems and to limit the occurrence of blow down.
PA-8.05	Grubbing will not be permitted within established buffer zones and setback distances from waterbodies.
PA-8.06	Stockpiled materials from grubbing will not block natural drainage patterns.
PA-8.07	Unless required for the work, the extent of grubbing will be minimized to the extent possible.
PA-8.08	When not under frozen conditions, erosion protection and sediment control measures will be put in place prior to grubbing in accordance with the Erosion Protection and Sediment Control Plan.
PA-8.09	Windrows of grubbed materials will be piled at least 15 m from standing timber.

Hazardous Materials (EI-4)

ID	Mitigation
EI-4.01	A Contractor specific Hazardous Substances Management Plan will be prepared by the Contractor, approved by the Construction Supervisor/Site Manager prior to construction and updated annually.
EI-4.02	Access to hazardous materials storage areas will be restricted to authorized and trained Contractor and Manitoba Hydro personnel.
EI-4.03	An inventory of WHMIS controlled substances will be prepared by the Contractor and maintained at each project site and updated as required by provincial legislation.
EI-4.04	Bulk waste oil will be stored in approved aboveground tanks provided with secondary containment in accordance with provincial legislation.
EI-4.05	Containers of hazardous substances stored outside will be labeled, weatherproof, placed on spill containment pallets and covered by a weatherproof tarp.
EI-4.06	Contractor personnel will be trained and certified in the handling of hazardous materials including emergency response procedures in accordance with provincial legislation.
EI-4.07	Contractor personnel will receive WHMIS training in accordance with provincial legislation.
EI-4.08	Controlled substances will be labeled in accordance with WHMIS requirements, required documentation will be displayed and current Materials Safety Data Sheets will be available at each project site in accordance with the Hazardous Substances Management Plan
EI-4.09	Empty hazardous waste containers will be removed to a licensed or approved disposal site.
EI-4.10	Hazardous materials storage sites will be secured, and signs will be posted that include hazard warnings, contacts in case of a release, access restrictions and under whose authority the access is restricted.
EI-4.11	Hazardous materials will be adequately contained and will be protected from wind and rain to prevent entry of fine particles into streams through runoff of dust deposition.
EI-4.12	Hazardous substance and WHMIS inventories will be completed prior to construction. Inventories will be updated in accordance with regulatory requirements and Manitoba Hydro policies.
EI-4.13	Hazardous substances management procedures will be communicated to all project staff and a copy will be made available at the project site.
EI-4.14	Hazardous substances storage areas including coke materials for ground electrode facilities will be located a minimum of 100 m from the ordinary high water mark of a waterway and above the 100-year flood level.
EI-4.15	Hazardous substances will be transported, stored and handled according to the procedures prescribed by provincial legislation and at a minimum follow Manitoba Hydro policies.
EI-4.16	Hazardous waste substances will be segregated and stored by type.
EI-4.17	Indoor storage of flammable and combustible substances will be in fire resistant and vented enclosed storage area or building in accordance with national codes and standards.
EI-4.18	Manitoba Hydro will approve all hazardous materials that are used on the project prior to their arrival on-site.
EI-4.19	Non-hazardous products will be used in place of hazardous substances to the extent possible.
EI-4.20	Orientation for Contractor and Manitoba Hydro employees working in construction areas will include hazardous substance awareness.

Hazardous Materials (EI-4)

EI-4.21	Pesticide storage will be in accordance with provincial legislation and Manitoba Hydro guidelines.
EI-4.22	The Contractor will be responsible for the safe use, handling, storage and disposal of hazardous substances including waste as well as procedures for emergency conditions in accordance with provincial and federal legislation and standards.
EI-4.23	The Contractor will monitor containers of hazardous substance containers regularly for leaks and to ensure that labels are displayed.
EI-4.24	The Environmental Inspector will make routine inspections of hazardous substance storage sites to ensure that environmental protection measures are implemented and effective.
EI-4.25	Waste oil will be transported by licensed carriers to licensed or approved waste oil recycling facilities.
EI-4.26	Wet batteries will be stored and transported to licensed or approved waste recycling facilities.

Heritage Resources (EC-5)

ID	Mitigation
EC-5.01	All archaeological finds discovered during site preparation and construction will be left in their original position until the Project Archaeologist is contacted and provides instruction.
EC-5.02	Construction activities will not be carried out within established buffer zones for heritage resources except as approved by Project Archaeologist.
EC-5.03	Environmental protection measures for heritage resources will be reviewed with the Contractor and employees prior to commencement of any construction activities.
EC-5.04	Orientation for project staff working in construction areas will include heritage resource awareness and training including the nature of heritage resources and the management of any resources encountered.
EC-5.05	Orientation information will include typical heritage resource materials and reporting procedures.
EC-5.06	The Contractor will report heritage resource materials immediately to the Construction Supervisor will cease construction activities in the immediate vicinity until the Project Archaeologist is contacted and prescribes instruction.
EC-5.07	The Culture and Heritage Resource Protection Plan will be adhered to during Preconstruction and construction activities.
EC-5.08	The Environmental Inspector will inspect borrow pits and other excavations regularly for the presence of heritage resource materials.

Management Measures (MM)

ID	Mitigation
MM-01	All licenses, permits, contracts, project specifications, guidelines and other applicable documents will be in the possession of both the Contractor and Manitoba Hydro prior to commencement of work.
MM-02	All project participants will ensure that project activities are carried out in compliance with applicable legislation, guidelines contractual obligations and environmental protection plan provisions.
MM-03	Environmental concerns will be identified and discussed at planning meetings on an as required basis.
MM-04	Manitoba Hydro will contact First Nation and Aboriginal community representatives prior to project start-up.
MM-05	Manitoba Hydro will contact local municipal authorities prior to project start-up.
MM-06	Manitoba Hydro will contact local resource users, lodge operators, outfitters and recreational resource users and associations to the extent feasible and practical prior to project start-up.
MM-07	Manitoba Hydro will contact Manitoba Conservation and Forest Management Licence Holders prior to clearing regarding timber use opportunities.
MM-08	Manitoba Hydro will meet the Contractor at the beginning of each new contract to review environmental protection requirements including mitigation measures, inspections and reporting.
MM-09	Manitoba Hydro will notify trappers in advance of clearing and construction schedules in their trapline areas.
MM-10	Manitoba Hydro will provide the contractor with a stakeholders list with names, organizations and contact information for the purpose of contacting stakeholders as necessary.
MM-11	Project construction update meetings will be held weekly for the ongoing review of environmental and safety issues.
MM-12	Relevant documents including licenses, permits, approvals, legislation, guidelines, environmental protection plans, orthophotos maps, etc will be made available to all project participants.
MM-13	Response to enforcement actions by regulatory authorities will be in accordance with Manitoba Hydro policy P602.
MM-14	The Contractor will obtain all licenses, permits, contracts and approvals other than those that are Manitoba Hydro's responsibility prior to project start-up.
MM-15	The Contractor will review terms and conditions of all authorizations, contract specifications, agreements, etc prior to project start-up and will discuss any questions or concerns with Manitoba Hydro.

Marshalling Yards (PC-5)

ID	Mitigation
PC-5.01	Contractor employees responsible for receipt and distribution of hazardous substances will be trained in handling and transportation of dangerous goods, and WHMIS.
PC-5.02	Emergency Preparedness and Response Plan and procedures for marshalling yards will be developed.
PC-5.03	Erosion protection, sediment control and drainage management measures will be put in place prior to construction.
PC-5.04	Fire breaks will be established around marshalling yards in areas where there is a risk of fire.
PC-5.05	Garbage and debris will be stored in approved containers, sorted for recycling and disposed of at a licensed or approved waste disposal site.
PC-5.06	Hazardous substances entering and leaving the marshalling yards will be inventoried and accounted for.
PC-5.07	Hazardous substances will be stored in accordance with provincial legislation, and provincial and national codes and standards.
PC-5.08	Marshalling yards will be located based on criteria that consider soils, topography, land form type, permafrost, wildlife habitat and other environmental factors.
PC-5.09	Marshalling yards will be located in existing clearings or natural openings.
PC-5.10	Marshalling yards will be located, constructed, operated and decommissioned in accordance with contact specifications.
PC-5.11	Once marshalling yards are no longer required, structures, equipment, materials, fences, etc. will be dismantled and moved to storage or a new location.
PC-5.12	Organic material, topsoil and sub-soil stripped during site preparation will be stockpiled separately for later use in site rehabilitation.
PC-5.13	Petroleum products will only be stored, handled and dispensed in designated areas within marshalling yards in accordance with provincial legislation and guidelines.
PC-5.14	Spill control and clean-up equipment to be located at designated areas within marshalling yards.
PC-5.15	Staging and work storage areas no longer required will be decommissioned and rehabilitated in accordance with the Rehabilitation and Vegetation Management Plan.
PC-5.16	Vegetation control at marshalling yards will be in accordance with Rehabilitation and Vegetation Management Plan.
PC-5.17	Vehicle, machinery and equipment maintenance and repairs will be carried out in designated areas within marshalling yards.
PC-5.18	Waste hazardous substances, fuel containers and other materials will be stored in approved containers and transported to licensed or approved waste disposal facilities by a licensed carrier.
PC-5.19	Welding mats will be used to minimize the risk of fire.

Petroleum Products (EI-5)

ID	Mitigation
EI-5.01	Aboveground tanks will be equipped with overfill protection and spill containment consisting of perimeter dykes or secondary containment in the tank design.
EI-5.02	All aboveground petroleum product tanks with a capacity greater than 5,000 L will be registered with Manitoba Conservation and Water Stewardship and have a valid operating permit.
EI-5.03	Construction, installation or removal of petroleum product storage tank systems will only occur under the supervision of a registered licensed petroleum technician.
EI-5.04	Containment measures, such as secondary containment (i.e., berms) will be used at all locations where stationary oil-filled equipment is used.
EI-5.05	Contractors will inspect all mobile and stationary equipment using petroleum products on a regular basis to ensure that measures are taken immediately to stop any leakage discovered.
EI-5.06	Fuelling of equipment or portable storage tanks will be a minimum of 100 m from the ordinary high water mark of any waterbody.
EI-5.07	Fuelling operations require the operator to be visually observing the process 100% of the time.
EI-5.08	If dykes are used, the containment areas will be dewatered after rainfall events and the containment water disposed of as specified in contract specifications.
EI-5.09	Once petroleum product storage areas are no longer required, a Phase I and II Environmental Site Assessment will be carried out to determine if remediation is required in accordance with national standards.
EI-5.10	Only approved aboveground petroleum storage tanks will be used during the construction phase of the project. No underground tanks will be permitted.
EI-5.11	Orientation for Contractor and Manitoba Hydro employees working in construction areas will include petroleum product storage and handling awareness.
EI-5.12	Petroleum product dispensing systems will be secured and locked when not in use by authorized personnel.
EI-5.13	Petroleum product inventories will be taken weekly by the owner/operator on all aboveground tanks greater than 5,000 L and retained for inspection by Manitoba Hydro or Manitoba Conservation upon request.
EI-5.14	Petroleum product storage containers in excess of 230 L will be located on level ground and will incorporate secondary containment with a capacity of 110% of the largest container volume.
EI-5.15	Petroleum product storage sites and mobile transportation units will be equipped with fire suppressant equipment and products.
EI-5.16	Petroleum product storage tanks will be protected from vehicle collisions by concrete filled bollards.
EI-5.17	Petroleum product storage will be located a minimum of 100 m from the ordinary high water mark of waterbodies, riparian areas or wetlands.
EI-5.18	Petroleum products stored outside will be in waterproof and labeled containers, placed on spill containment pallets.
EI-5.19	Petroleum products will be transported and handled according to the procedures prescribed by provincial legislation.

Petroleum Products (EI-5)	
EI-5.20	Petroleum products will display required signage, placards and labeling, and will be stored and handled in accordance with provincial legislation.
EI-5.21	Petroleum products will only be stored and handled within designated areas at construction camps and marshalling yards.
EI-5.22	Portable petroleum product storage containers will be placed on spill trays with a capacity of 110% of the largest container when not in use.
EI-5.23	Slip tanks and barrels will be securely fastened to the vehicle during transport and fuelling operations.
EI-5.24	Spill control and clean-up equipment and materials will be available at all petroleum product storage and dispensing locations.
EI-5.25	Spill trays will remain impervious at very low temperatures (-45 °C) and have accumulated precipitation removed regularly.
EI-5.26	The Contractor will be responsible for the safe use, handling, storage and disposal of petroleum products including waste as well as procedures for emergency conditions in accordance with provincial and federal legislation and standards.
EI-5.27	The Contractor will inspect all petroleum product storage tanks and containers regularly for leaks, and product inventories will be recorded and retained for inspection by Manitoba Hydro and Manitoba Conservation and Water Stewardship.
EI-5.28	There will be no ignition sources in and adjacent to petroleum product storage areas.
EI-5.29	Transfer of petroleum products between storage areas and work sites not exceed daily requirements and will be in accordance with provincial legislation and guidelines.
EI-5.30	Used petroleum products (including empty containers) will be collected and transported to a licensed oil recycling facility in approved storage containers.
EI-5.31	Vehicles hauling petroleum products will carry equipment and materials for emergency spill containment and clean-up.
EI-5.32	Warning signs will be posted in visible locations around petroleum product storage areas. Signs will indicate hazard warning, contact in case of a spill, access restrictions and authority.

Rehabilitating and Re-vegetation (PA-9)

ID	Mitigation
PA-9.01	Construction areas no longer required will be re-contoured, stabilized, re-vegetated and restored to near natural conditions in accordance with Rehabilitation and Vegetation Management Plan
PA-9.02	Natural re-vegetation will be allowed to occur although active rehabilitation programs may be required at specific sites where erosion warrants seeding or planting
PA-9.03	Organic material, topsoil and subsoil stripped from construction areas will be stockpiled and protected to be used for future site rehabilitation.
PA-9.04	Rehabilitation of construction areas will incorporate erosion protection and sediment control measures in accordance with the Erosion and Sediment Control Plan as required.
PA-9.05	Rehabilitation Plans will include objectives for restoration of natural conditions, erosion protection, sediment control, non-native and invasive plant species management, wildlife habitat restoration and restoration of aesthetic values as required.
PA-9.06	Where appropriate, regional native grass mixtures will be used to assist re-vegetation of disturbed areas to control erosion or prevent invasion of non-native species. The mixtures will not contain non-native or invasive species.

Rights-of-Way (PC-8)

ID	Mitigation
PC-8.01	Access to transmission line rights-of-way for clearing and construction will utilize existing roads and trails to the extent possible.
PC-8.02	Access to transmission line rights-of-way will be closed, signed and/or controlled in accordance with an Access Management Plan.
PC-8.03	Additional clearing outside established rights-of-way will be approved by the Construction Supervisor/Site Manager prior to clearing and may require an amendment to contract specifications.
PC-8.04	Clearing and disturbance will be limited to defined rights-of-way and associated access routes to the extent possible.
PC-8.05	Clearing of rights-of-way will occur under frozen or dry ground conditions during established timing windows to minimize rutting and erosion where applicable.
PC-8.06	Construction vehicles will be wide-tracked or equipped with high floatation tires to minimize rutting and limit damage and compaction to surface soils.
PC-8.07	Disturbed areas along transmission line rights-of-way will be rehabilitated in accordance with site Rehabilitation and Vegetation Management Plan.
PC-8.08	Environmentally sensitive sites, features and areas will be identified and mapped prior to clearing.
PC-8.09	In situations where the ROW doesn't have completely frozen or have dry ground conditions alternate products such as construction mats will be used.

Safety and Health (EI-6)

ID	Mitigation
EI-6.01	Orientation for Contractor and Manitoba Hydro employees working in construction areas will include safety and health awareness.
EI-6.02	Safety and health information will be posted at each project location and made available to all project personnel.
EI-6.03	Workplace safety and health committees will be established and safety meetings will be held as required by provincial legislation and Manitoba Hydro guidelines at all project locations.

Soil Contamination (EI-7)

ID	Mitigation
EI-7.01	A closure report will be prepared for completed remediation projects in accordance with provincial and Manitoba Hydro guidelines.
EI-7.02	A Remediation Plan will be prepared by the Contractor for sites contaminated by project activities and will remediate soils according to provincial standards.
EI-7.03	All spills and releases reported will be responded to in accordance with provincial legislation and guidelines and Manitoba Hydro guidelines.
EI-7.04	Any contaminated soil treatment areas must be designed and constructed to contain surface runoff and prevent leaching to soil and groundwater.
EI-7.05	Contractor personnel will take all reasonable steps to prevent soil, groundwater and surface water contamination.
EI-7.06	If contamination is suspected or evident, a Phase II Environmental Site Assessment will be carried out on previously used construction sites following Manitoba Hydro procedures.
EI-7.07	If laboratory results show that the soil is contaminated the soil must be treated on-site or transported to an approved landfill or land farm for remediation in accordance with a Remediation Plan.
EI-7.08	If laboratory results show that the soil is not contaminated then the soils may be used in accordance with contact specifications.
EI-7.09	Remediation Plans will be prepared by the Contractor and approved by the Construction Supervisor/Site Manager prior to implementation if remediation of contaminated soils is determined to be required.
EI-7.10	The Contractor will assess previously used construction sites for potential contamination following Canadian Standards Association Environmental Site Assessment (CSA Z768- 01 and Z769-00) procedures.
EI-7.11	The Contractor will carry out a CSA Phase II Environmental Site Assessment (CSA Z769-00) at abandoned construction camps, marshalling yards, petroleum product storage and dispensing areas and hazardous substance storage areas if contamination is suspected
EI-7.12	The Environmental Inspector will inspect contaminated site assessment and remediation work regularly to ensure that environmental protection measures are implemented and effective.

Stream Crossings (PC-9)

ID	Mitigation
PC-9.01	Access road crossings will be at right angles to waterbodies to the extent possible.
PC-9.02	Construction of temporary crossings will follow the Fisheries and Oceans Canada Manitoba Operational Statement for Temporary Stream Crossings.
PC-9.03	Construction of transmission line stream crossings will follow the Fisheries and Oceans Canada Manitoba Operational Statement for Overhead Line Construction.
PC-9.04	Where applicable, the Fisheries and Oceans Canada Manitoba Operational Statement for Isolated or Dry Open Cut Stream Crossings and/or High-pressure Directional Drilling will be adhered to.
PC-9.05	Riparian Buffers shall be a minimum of 30m and increase in size based on slope of land entering waterway. (See Riparian Buffer Table in CEnvPP) Within these buffers shrub and herbaceous understory vegetation will be maintained along with trees that do not violate Manitoba Hydro Vegetation Clearance Requirements.
PC-9.06	Construction vehicles, machinery and heavy equipment will not be permitted in designated machine-free zones except at designated crossings.

Stripping (PA-10)

ID	Mitigation
PA-10.01	Construction areas containing soil with high silt content, artesian springs or areas of previous erosion will receive special erosion protection and sediment control techniques.
PA-10.02	Erosion protection and sediment control measures will put be in place prior to stripping in accordance with the Erosion and Sediment Control Plan as required.
PA-10.03	In areas of known salinity, excavated or stripped soil will be stored on liners or in designated areas were possible.
PA-10.04	Mineral topsoils and surficial organic materials should be stripped separately from subsoils, segregated, and stockpiled for later use in backfilling, contouring and rehabilitation. Soils should be replaced in the reverse order to which they were removed.
PA-10.05	Stockpiled materials from stripping will not block natural drainage patterns.
PA-10.06	Stripping in northern Manitoba will normally be carried out under frozen ground conditions during established timing windows to minimize rutting and erosion.
PA-10.07	Stripping will not be permitted within established buffer zones and setback distances from waterbodies except where approved in work permits, authorizations or contract specifications.
PA-10.08	The Contractor will stabilize construction areas requiring extensive stripping as soon as possible to minimize erosion.

Transmission Towers and Conductors (PC-10)

ID	Mitigation
PC-10.01	Areas where soil was disturbed will be stabilized and re-vegetated with low growth vegetation as soon as practical.
PC-10.02	During tower foundation excavation the duff layer and A horizon soils shall be stripped and stored separately from other soils. When back filling, these soils are to be replaced as the surface soils to encourage site re-vegetation.
PC-10.03	Excavations required for tower installations will be restricted to the minimum required footprint.
PC-10.04	The Construction Supervisor will issue a stop work order if extreme wet weather conditions result in soil damage from rutting and erosion is resulting in sedimentation of adjacent waterbodies.

Treated Wood (EI-8)

ID	Mitigation
EC-8.01	Salvage and disposal of treated wood products will be in accordance with Manitoba Hydro guidelines.
EC-8.02	Small quantities of surplus or unwanted treated wood products may be disposed of as domestic waste products at licensed or approved waste disposal sites.
EC-8.03	Treated wood products will not be used indoors and will not be burned.
EC-8.04	Treated wood will be delivered to project locations or construction sites on an as required basis to reduce storage time in the field.

Vehicle and Equipment Maintenance (EI-9)

ID	Mitigation
EI-9.01	An Emergency Preparedness and Response Plan and spill control and clean-up equipment will be provided at all designated vehicle, equipment and machinery maintenance areas.
EI-9.02	Emergency vehicle, equipment and machinery maintenance repairs will contain waste fluids and will use drip trays and tarps.
EI-9.03	Unnecessary idling of vehicles, equipment and machinery will be avoided to the extent practical.
EI-9.04	Vehicle, equipment and machinery maintenance and repairs will be carried out in designated areas located at least 100 m from the ordinary high water mark of a waterbody, riparian area or wetland.
EI-9.05	Vehicle, equipment and machinery operators will perform a daily inspection for fuel, oil and fluid leaks and will immediately shutdown and repair any leaks found. All machinery working near watercourses will be kept clean and free of leaks.
EI-9.06	Vehicles transporting dangerous goods or hazardous products will display required placards and labeling in accordance with provincial legislation and Manitoba Hydro guidelines.
EI-9.07	Vehicles, equipment and machinery must arrive on site in clean condition free of fluid leaks and weed seeds.
EI-9.08	Vehicles, equipment and machinery that carry fuel, hydraulic oil and other petroleum products will also carry spill control and clean-up equipment and materials.

Waste Management (EI-10)

ID	Mitigation
EI-10.01	A Contract specific Waste and Recycling Management Plan will be prepared by the Contractor, reviewed by the Construction Supervisor and Environmental Specialist prior to construction and updated annually.
EI-10.02	Bear-proof waste containers and/or electric fencing will be used in northern, remote and rural project locations.
EI-10.03	Construction sites will be kept tidy at all times and bins will be provided wherever solid wastes are generated.
EI-10.04	Indiscriminate burning, dumping, littering or abandonment will not be permitted.
EI-10.05	Kitchen wastes will be stored in closed containers to minimize wildlife interactions.
EI-10.06	Solid waste materials will be collected and transported to a licensed or approved waste disposal facility in accordance with the Solid Waste/Recycling Management Plan.
EI-10.07	Waste materials remaining at snow disposal sites after melting will be disposed of at a licensed or approved landfill.

Wetlands (EC-8)

ID	Mitigation
EC-8.01	Clearing wastes and other construction debris or waste will not be placed in wetland areas. Existing logs, snags and wood debris will be left in place.
EC-8.02	Environmental protection measures for working in and around wetlands will be reviewed with the Contractor and employees prior to commencement of any construction activities.
EC-8.03	Natural vegetated buffer areas of 30 m will be established around wetlands and riparian zones will be maintained to the extent possible.
EC-8.04	Project activities will avoid wetland areas to the extent possible. If avoidance is not practical, the extent of disturbance will be minimized. Disturbance of wetlands will only be carried out under frozen ground conditions.

Wildlife Protection (EC-9)

ID	Mitigation
EC-9.01	Any wildlife killed or injured by vehicles will be reported to Manitoba Conservation.
EC-9.02	Bird Diverters or aerial markers may be installed in high bird traffic areas.
EC-9.03	Boundaries of important wildlife habitats will be flagged by prior to commencement of construction.
EC-9.04	Clearing will occur during late fall and winter to the extent possible to avoid the spring/summer nesting season for birds and parturition times for mammal species and breeding windows for frog species
EC-9.05	Construction activities will not be carried out during prescribed timing windows for wildlife species.
EC-9.06	Construction camps will be kept clean, food will be kept in sealed storage areas, and kitchen wastes will be stored in bear-proof containers and/or electric fencing in northern and rural areas.
EC-9.07	Hunting and harvesting of wildlife by project staff will not be permitted while working on the project sites.
EC-9.09	Manitoba Conservation will be notified if animal traps are encountered and must be removed for project activities.
EC-9.10	MB Conservation and Department of Fisheries and Oceans will be notified if beaver dams must be cleared along rights-of-way and access roads and trails. Clearing of dams will be carried out in accordance of the DFO Operational Statement on Beaver Dam Removal
EC-9.11	No firearms will be permitted at construction sites.
EC-9.12	Orientation for Contractor and Manitoba Hydro employees will include awareness of environmental protection measures for wildlife and wildlife habitat.
EC-9.13	Problem wildlife will be reported immediately to Manitoba Conservation and Water Stewardship.
EC-9.14	Trails through or near important habitat types will be managed in accordance with the Access Management Plan.
EC-9.15	Trees containing large nests of sticks and areas where active animal dens or burrows are encountered will be left undisturbed until unoccupied. Artificial structures for nesting may be provided if unoccupied nests must be removed.
EC-9.16	Vehicles will not exceed posted speed limits and wildlife warning signs may be installed in high density areas and at known crossings locations as a result of wildlife monitoring.
EC-9.17	Where buffer zones or setbacks are not feasible for colonial waterbirds, bird deflectors will be placed on sky wires to improve visibility of the wires to birds and to minimize potential bird-wire collisions.
EC-9.18	Wildlife and wildlife habitat will be protected in accordance with provincial and federal legislation and provincial and federal guidelines.
EC-9.19	Wildlife will not be fed, befriended or harassed at construction areas.
EC-9.21	Understory vegetation will be managed at access routes to limit line of sight.
EC-9.22	New by-pass trails and access routes will be sited where possible to utilize existing natural terrain features and existing vegetation to minimize line of site.

10.3.6 Specific Environmental Protection Measures

Specific environmental protection measures will be provided for environmentally sensitive sites where general measures do not provide adequate mitigation of potential effects. Environmentally sensitive sites are locations, features, areas, activities or facilities along or immediately adjacent to the transmission line right of way and other project components that are determined to be ecologically, socially, economically or culturally important and sensitive to disturbance by the Project and, as a result, require site-specific mitigation measures. The sites may include sensitive or unique terrain features, water bodies and wetlands, important mammal, bird, and amphibian habitats, protected species and areas, and heritage resources.

Manitoba Hydro has been working with aboriginal communities prior to the start of construction to identify and map sites and develop mitigation measures to minimize the effects of the project on them.

For the Construction and Operation Phase EnvPPs, orthophoto map sheets will provide Manitoba Hydro project managers, construction supervisors and employees, and contractors and contract employees detailed site-specific environmental protection information that can be implemented, managed, evaluated and reported on in the field. The orthophoto map sheets will be provided in paper and electronic formats which will be used by Manitoba Hydro, contractor and regulatory staff on laptop computers in field offices, vehicles and aircraft.

10.3.7 Follow-up Activities

Follow-up is an activity carried out to verify the accuracy of the environmental assessment of a project, assess the effectiveness of measures taken to mitigate adverse effects and determine compliance with regulatory requirements. Follow-up identified in Chapter 9.0 will be implemented through inspection, monitoring, management and auditing actions.

Inspection

Inspection is the organized and routine examination or evaluation, including observations, measurements and sometimes tests, of a construction project or activity. Inspection results are compared to pre-defined requirements or standards to determine whether an activity conforms to these requirements. Inspection provides an essential function in environmental protection and implementation of mitigation measures. Much of the success in environmental protection will be attributable to how well environmental inspection is carried out during the construction phase of a project.

Manitoba Hydro has established a comprehensive and integrated environmental inspection program to ensure effective implementation of environmental protection measures, compliance with regulatory approvals and fulfillment of corporate environmental objectives.

Trained inspectors visit work sites and inspect for compliance with licence terms and conditions, and adherence to environmental protection measures. Inspection activities are recorded in journals and daily inspection forms that are submitted to the Construction Supervisor. Weekly and monthly summary reports are also submitted to the Manitoba Hydro Project Manager and senior management as required or requested.

Monitoring

Monitoring is the continuing observation, measurement or assessment of environmental conditions at and surrounding a construction project or activity. Two main types of monitoring are typically undertaken for environmental assessments:

1) environmental monitoring to verify the accuracy of the predictions made and the effectiveness of the mitigation measures implemented; and
2) compliance monitoring to verify whether a practice or procedure meets legislated requirements.

Monitoring determines if environmental effects occur as predicted, residual effects remain within acceptable limits, regulatory limits, criteria or objectives are not exceeded and mitigation measures are as effective as predicted. Monitoring also allows for adaptive management where monitoring results show there is a need for additional environmental protection or enhancement.

Monitoring plans will describe parameters to be monitored, methods to be used, roles and responsibilities, and reporting schedules. Monitoring will be carried out by Manitoba Hydro and may be contracted to environmental consultants that possess the necessary expertise, equipment and analytical facilities.

Management

Management is the control of pre-defined environmental effects, issues and concerns through the implementation of reasoned and approved courses of action. Management plans will be prepared to address important management issues, regulatory requirements and corporate commitments identified in the EA Report. The management plans will describe the management actions, roles and responsibilities, evaluation mechanisms, updating requirements and reporting schedules. The following management plans, if required, will be prepared prior to the construction of the Project:

- Access Management Plan
- Vegetation Management and Rehabilitation Plan
- Heritage Resources Protection Plan
- Erosion Protection and Sediment Control Plans
- Emergency Preparedness and Response Plans
- Solid Waste/Recycling Management Plans

The above plans will be prepared by Manitoba Hydro or its Contractor's and may be contracted to environmental consultants that possess the necessary expertise and experience.

10.3.8 Review and Updating

The Construction EnvPP will be reviewed annually or at the end of each construction season. Reviews will be conducted by Manitoba Hydro personnel in consultation with the Contractor, and regulators. Checklists will be used to ensure that reviews address all required information in a consistent manner. The results of each review will be summarized in a report that documents the issues addressed and provides recommended updates to the CEnvPP.

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11.2 PERSONAL COMMUNICATIONS

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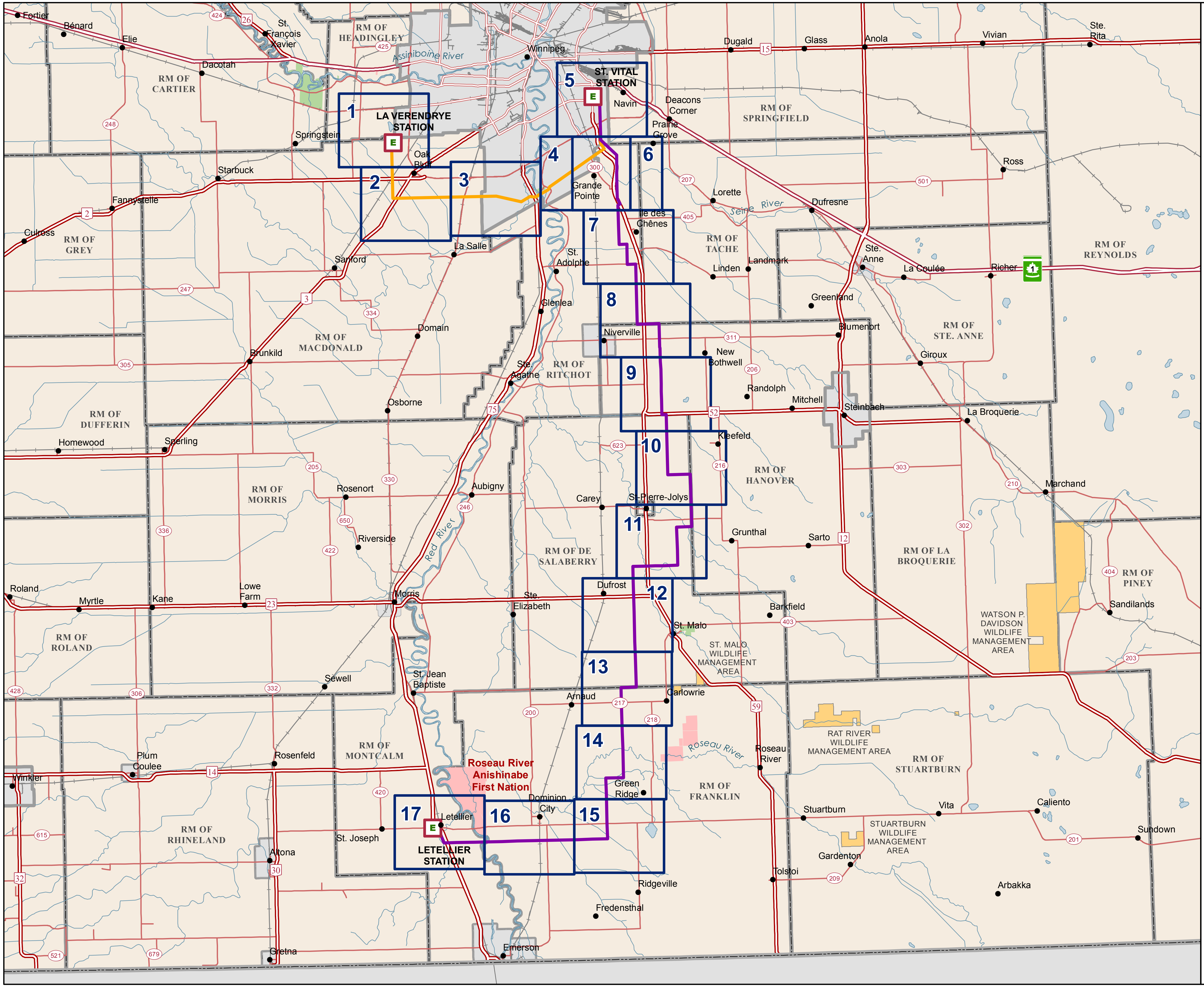
12.0 LAND PARCEL MAP FOLIO



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

E	Electrical Station
▬	Final Preferred Route (V95L)
▬	La Verendrye-St.Vital (Y36V) Transmission Line

Map Grid Index

▭	Map Grid (30k)

Landbase

●	Community
1	Trans Canada
20	Provincial Highway
—	Provincial Road
┼	Railway
▭	City / Town
▭	Rural Municipality
▭	First Nation
▭	Provincial Park
▭	Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 13, 2014

N

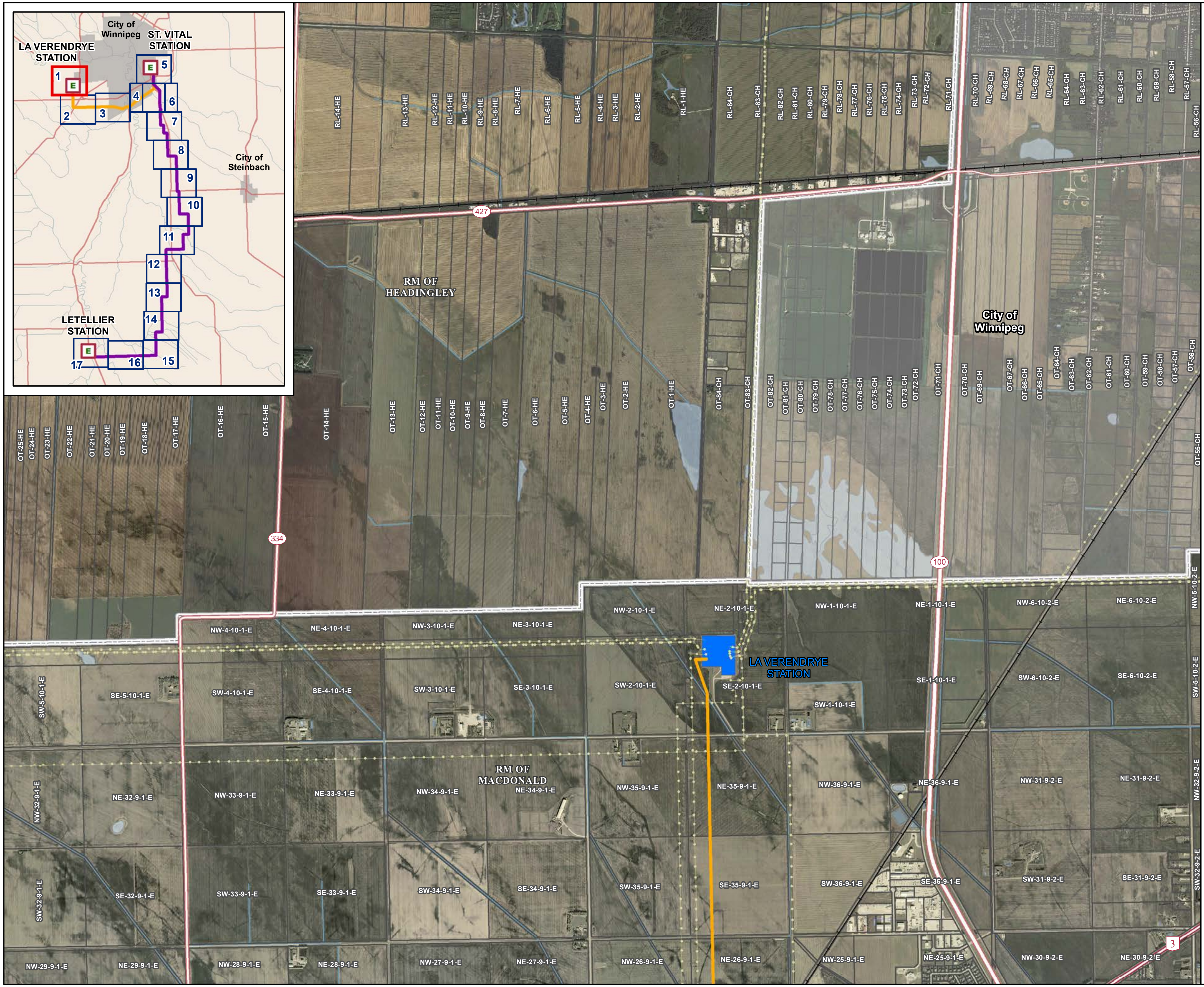
0 5 10 Kilometres
0 2.5 5 Miles

1:400,000

Final Preferred Route

30k Map Folio Index

Map 12-100



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- 🟦 Electrical Station
- Final Preferred Route (V95L)
- La Verendrye-St. Vital (Y36V) Transmission Line

Infrastructure

- Transmission Line

Landbase

- ○ Community
- Trans Canada
- Provincial Highway
- Provincial Road
- Railway
- ☐ Land Parcel
- Rural Municipality
- First Nation
- Provincial Park
- Wildlife Management Area
- Watercourse
- Waterbody

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 13, 2014

N

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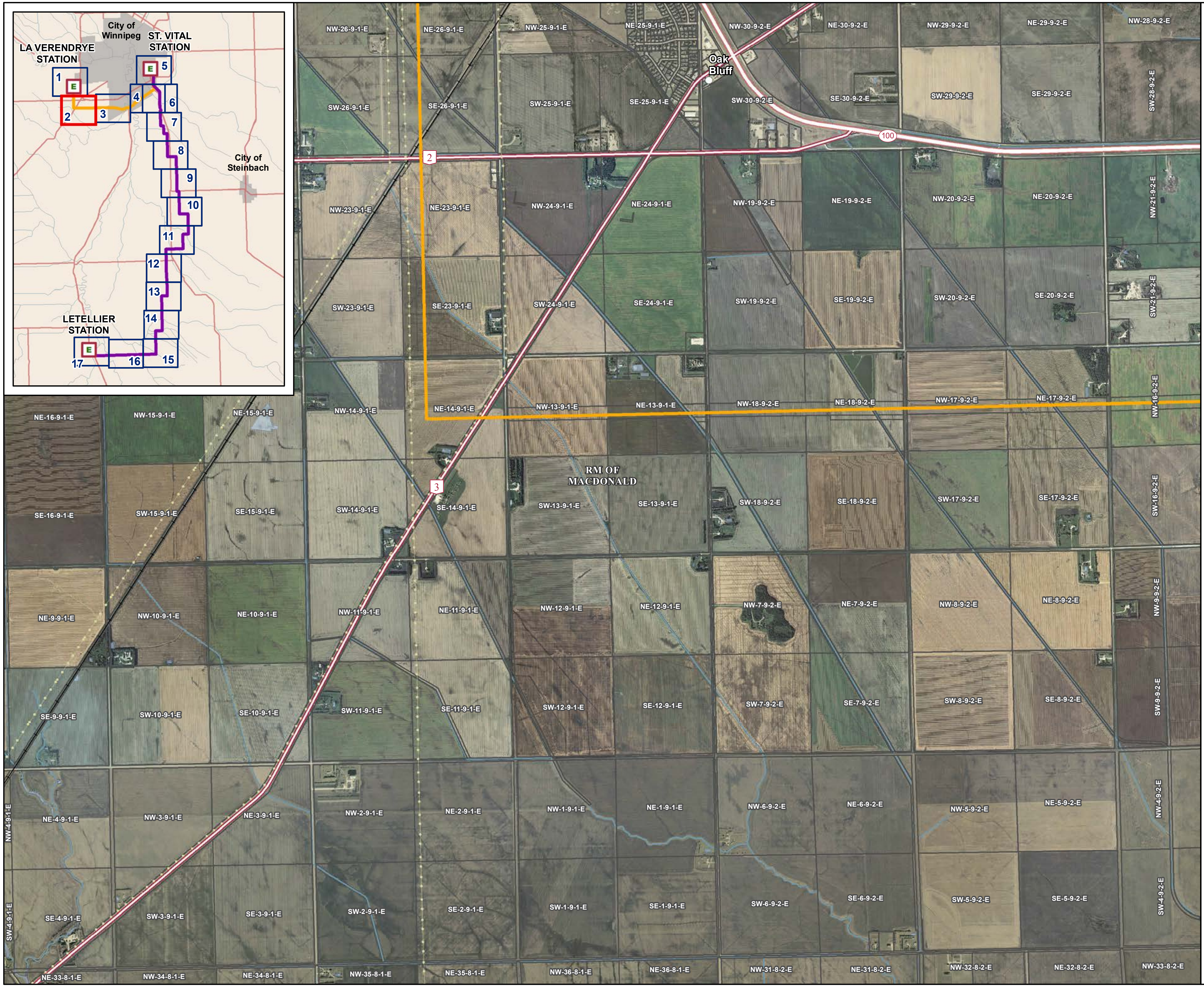
0 0.5 1 Miles 1:30,000

Final Preferred Route

30k Map Folio

Map 12-100 - 1



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- 🟦 Electrical Station
- ▬ Final Preferred Route (V95L)
- ▬ La Verendrye-St. Vital (Y36V) Transmission Line

Infrastructure

- ┈ Transmission Line

Landbase

- ○ Community
- Trans Canada
- 2 Provincial Highway
- 100 Provincial Road
- ┼ Railway
- ☐ Land Parcel
- ☐ Rural Municipality
- 🟥 First Nation
- 🟩 Provincial Park
- 🟨 Wildlife Management Area
- ─ Watercourse
- 🟦 Waterbody

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
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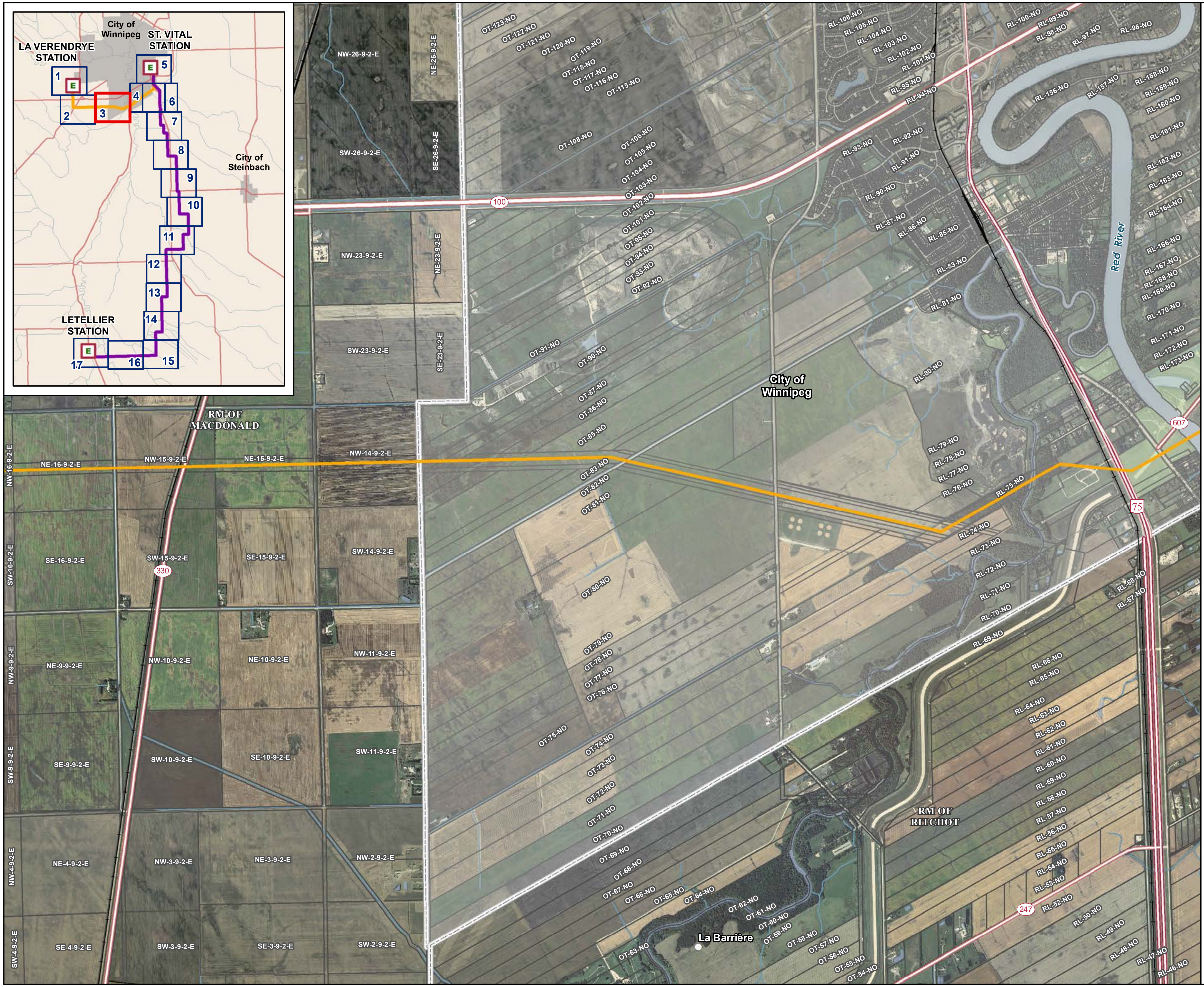
N

0 0.5 1 Kilometres
0 0.5 1 Miles 1:30,000

Final Preferred Route

30k Map Folio

Map 12-100 - 2



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

🟦 Electrical Station
Final Preferred Route (V95L)
La Verendrye-St. Vital (Y36V) Transmission Line

Infrastructure

Transmission Line

Landbase

○ Community
Trans Canada
Provincial Highway
Provincial Road
Railway
☐ Land Parcel
Rural Municipality
First Nation
Provincial Park
Wildlife Management Area
Watercourse
Waterbody

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 13, 2014

N

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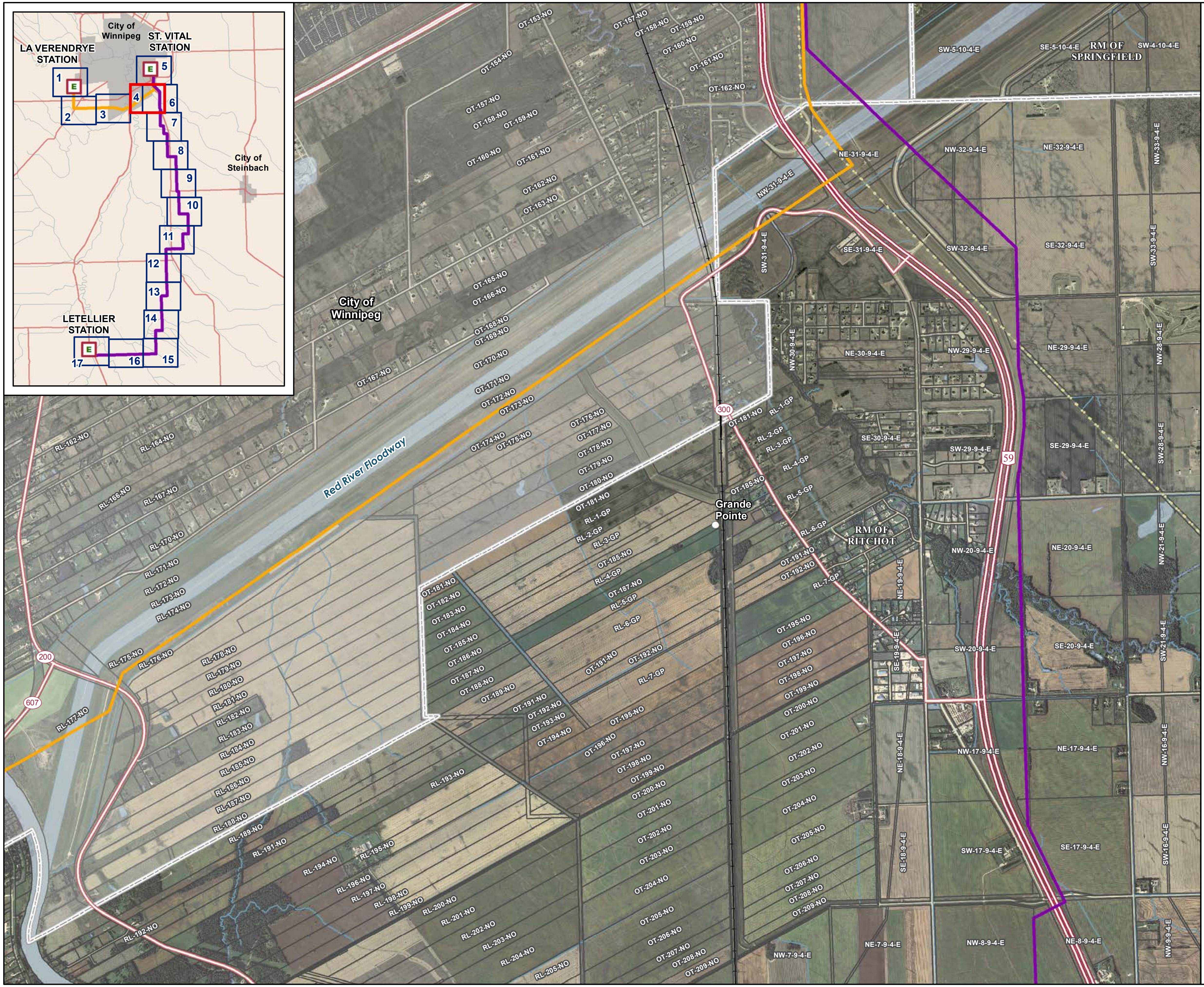
0 0.5 1 Miles
1:30,000

Final Preferred Route

30k Map Folio

Map 12-100 - 3



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

🟦	Electrical Station
—	Final Preferred Route (V95L)
—	La Verendrye-St. Vital (Y36V) Transmission Line

Infrastructure

···	Transmission Line

Landbase

○	Community
1	Trans Canada
2	Provincial Highway
100	Provincial Road
—+—	Railway
☐	Land Parcel
☐	Rural Municipality
▭	First Nation
🟩	Provincial Park
🟨	Wildlife Management Area
—	Watercourse
▭	Waterbody

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 13, 2014

N

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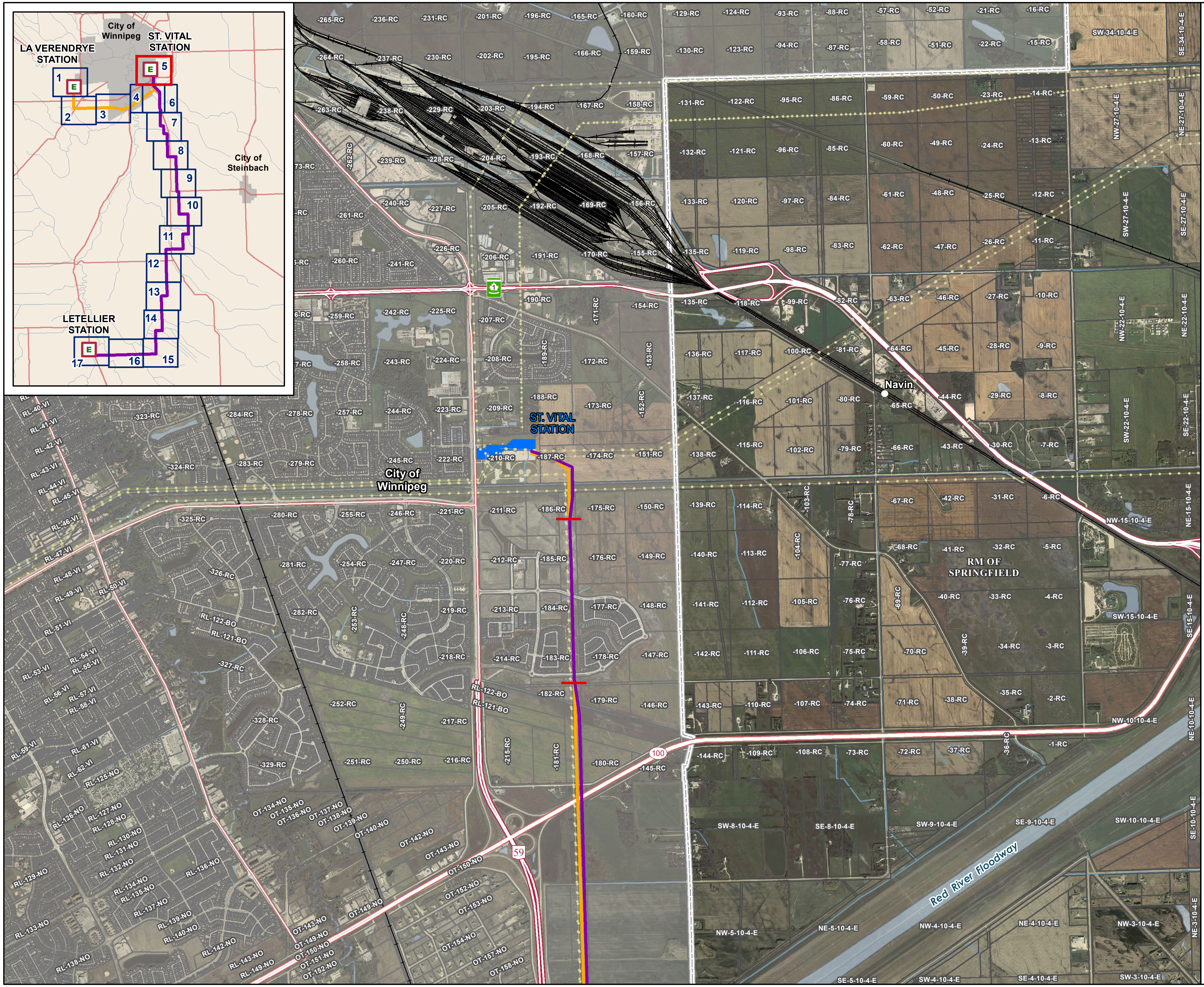
0 0.5 1 Miles 1:30,000

Final Preferred Route

30k Map Folio

Map 12-100 - 4



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- 🟦 Electrical Station
- — Final Preferred Route (V95L)
- ⊢⊣ V95L and Y36V Double Circuit Section
- — La Verendrye-St. Vital (Y36V) Transmission Line

Infrastructure

- ┈ Transmission Line

Landbase

- ○ Community
- Trans Canada
- Provincial Highway
- Provincial Road
- Railway
- ☐ Land Parcel
- Rural Municipality
- First Nation
- Provincial Park
- Wildlife Management Area
- Watercourse
- Waterbody

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 13, 2014

N

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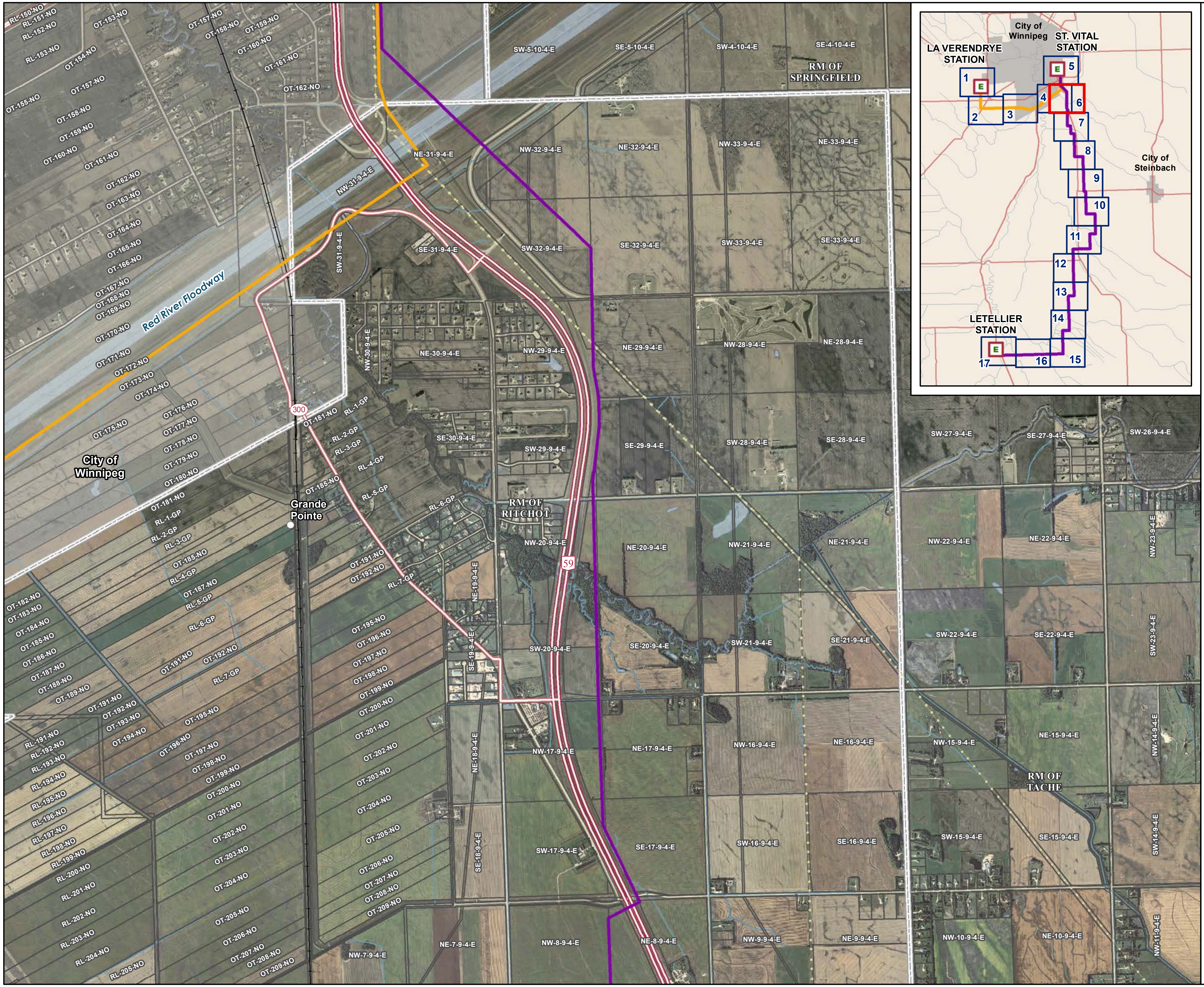
0 0.5 1 Miles 1:30,000

Final Preferred Route

30k Map Folio

Map 12-100 - 5



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

🟦	Electrical Station
━	Final Preferred Route (V95L)
━	La Verendrye-St. Vital (Y36V) Transmission Line

Infrastructure

┈	Transmission Line

Landbase

○	Community
1	Trans Canada
2	Provincial Highway
100	Provincial Road
┼	Railway
☐	Land Parcel
☐	Rural Municipality
▭	First Nation
▭	Provincial Park
▭	Wildlife Management Area
─	Watercourse
▭	Waterbody

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 13, 2014

N

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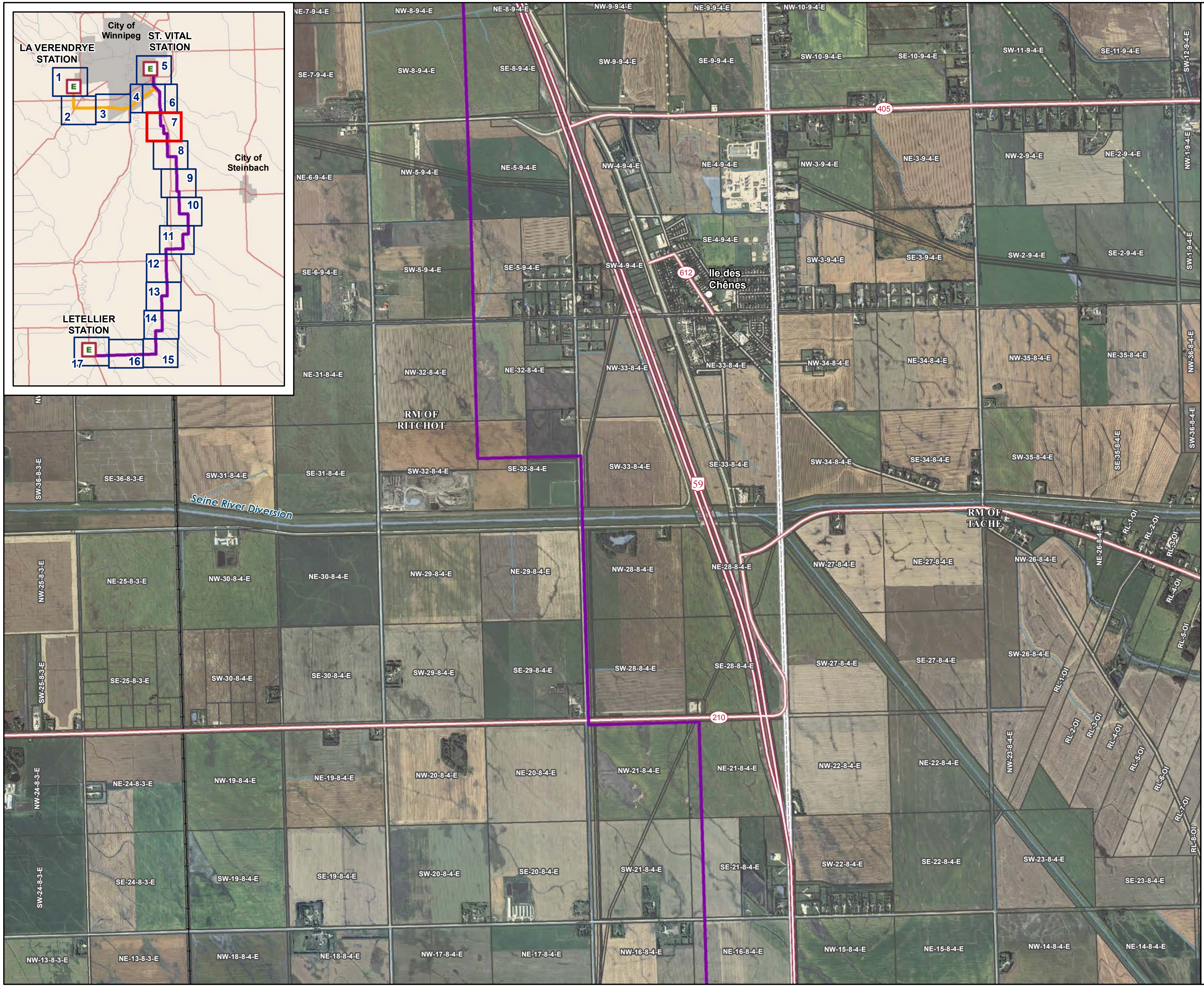
0 0.5 1 Miles 1:30,000

Final Preferred Route

30k Map Folio

Map 12-100 - 6



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- 🟦 Electrical Station
- Final Preferred Route (V95L)
- La Verendrye-St. Vital (Y36V) Transmission Line

Infrastructure

- Transmission Line

Landbase

- ○ Community
- Trans Canada
- Provincial Highway
- Provincial Road
- Railway
- ☐ Land Parcel
- Rural Municipality
- First Nation
- Provincial Park
- Wildlife Management Area
- Watercourse
- Waterbody

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 13, 2014

N

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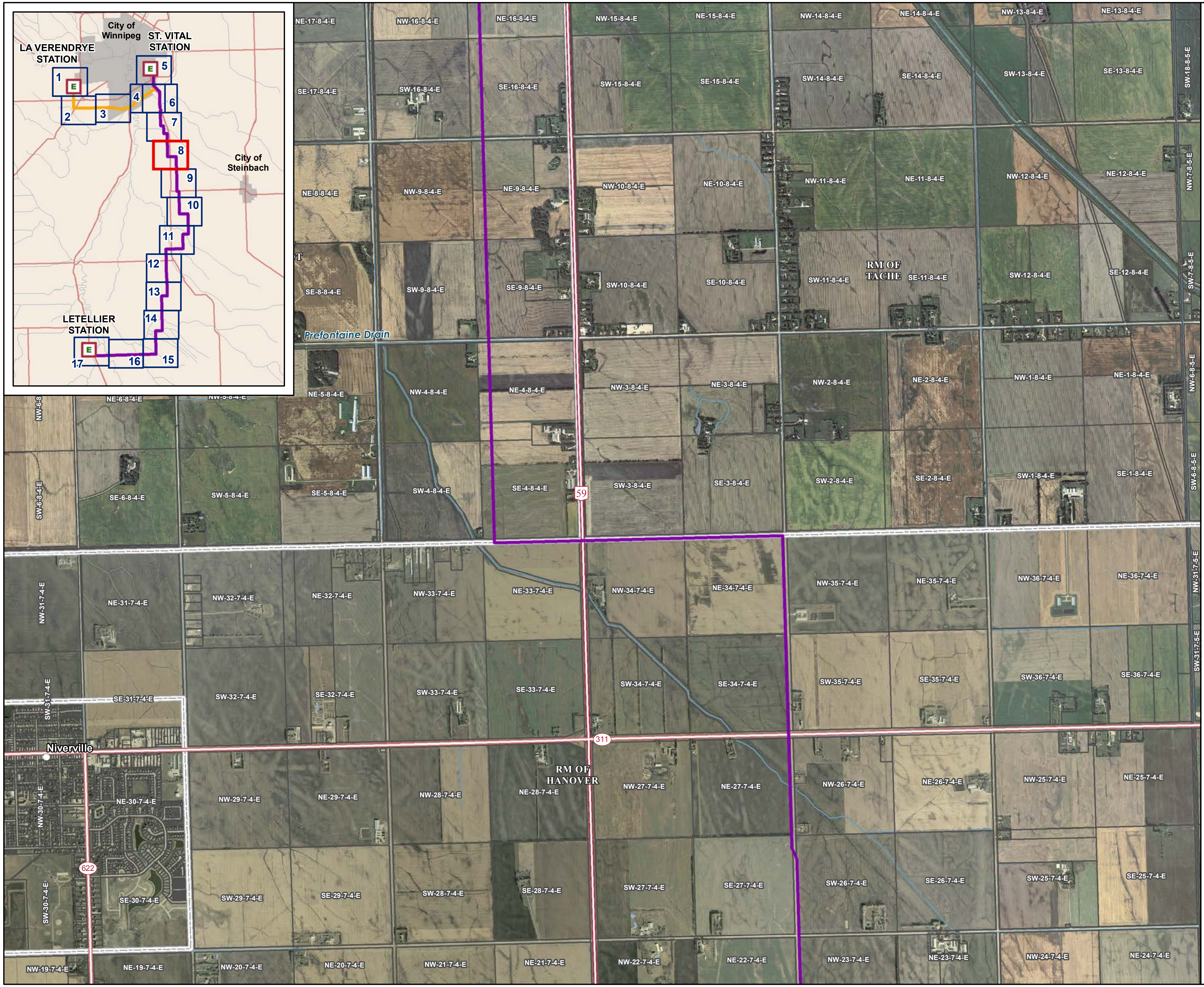
0 0.5 1 Miles
1:30,000

Final Preferred Route

30k Map Folio

Map 12-100 - 7



St. Vital Transmission Complex

Project Infrastructure

- 🟦 Electrical Station
- Final Preferred Route (V95L)
- La Verendrye-St. Vital (Y36V) Transmission Line

Infrastructure

- Transmission Line

Landbase

- ○ Community
- Trans Canada
- Provincial Highway
- Provincial Road
- Railway
- ☐ Land Parcel
- Rural Municipality
- First Nation
- 🟩 Provincial Park
- 🟨 Wildlife Management Area
- Watercourse
- Waterbody

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 13, 2014

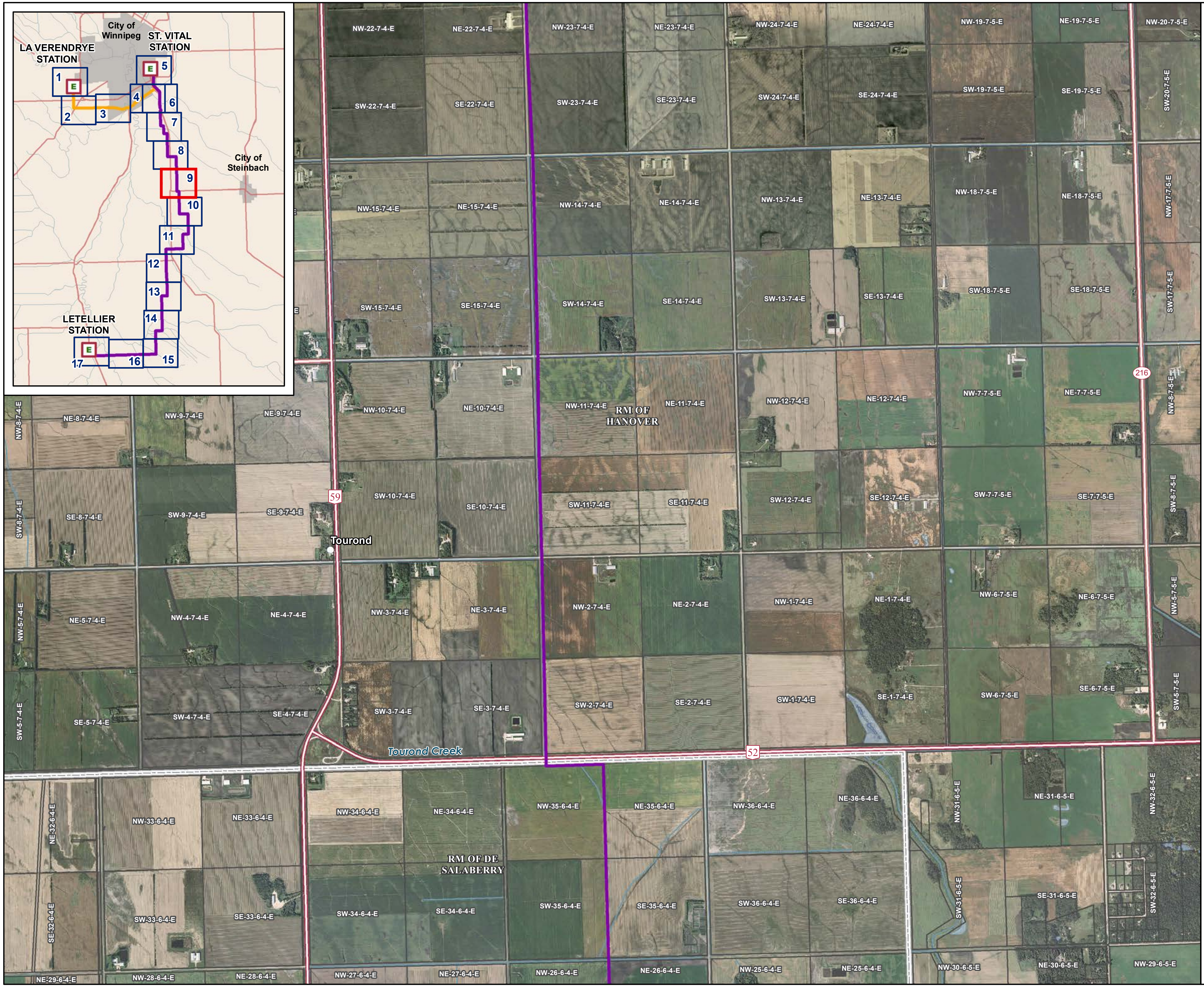
N

0 0.5 1 Kilometres
0 0.5 1 Miles 1:30,000

Final Preferred Route

30k Map Folio

Map 12-100 - 8



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

🟦	Electrical Station
━	Final Preferred Route (V95L)
━	La Verendrye-St. Vital (Y36V) Transmission Line

Infrastructure

┄	Transmission Line

Landbase

○	Community
1	Trans Canada
2	Provincial Highway
100	Provincial Road
┼	Railway
☐	Land Parcel
☐	Rural Municipality
🟥	First Nation
🟩	Provincial Park
🟨	Wildlife Management Area
─	Watercourse
🟦	Waterbody

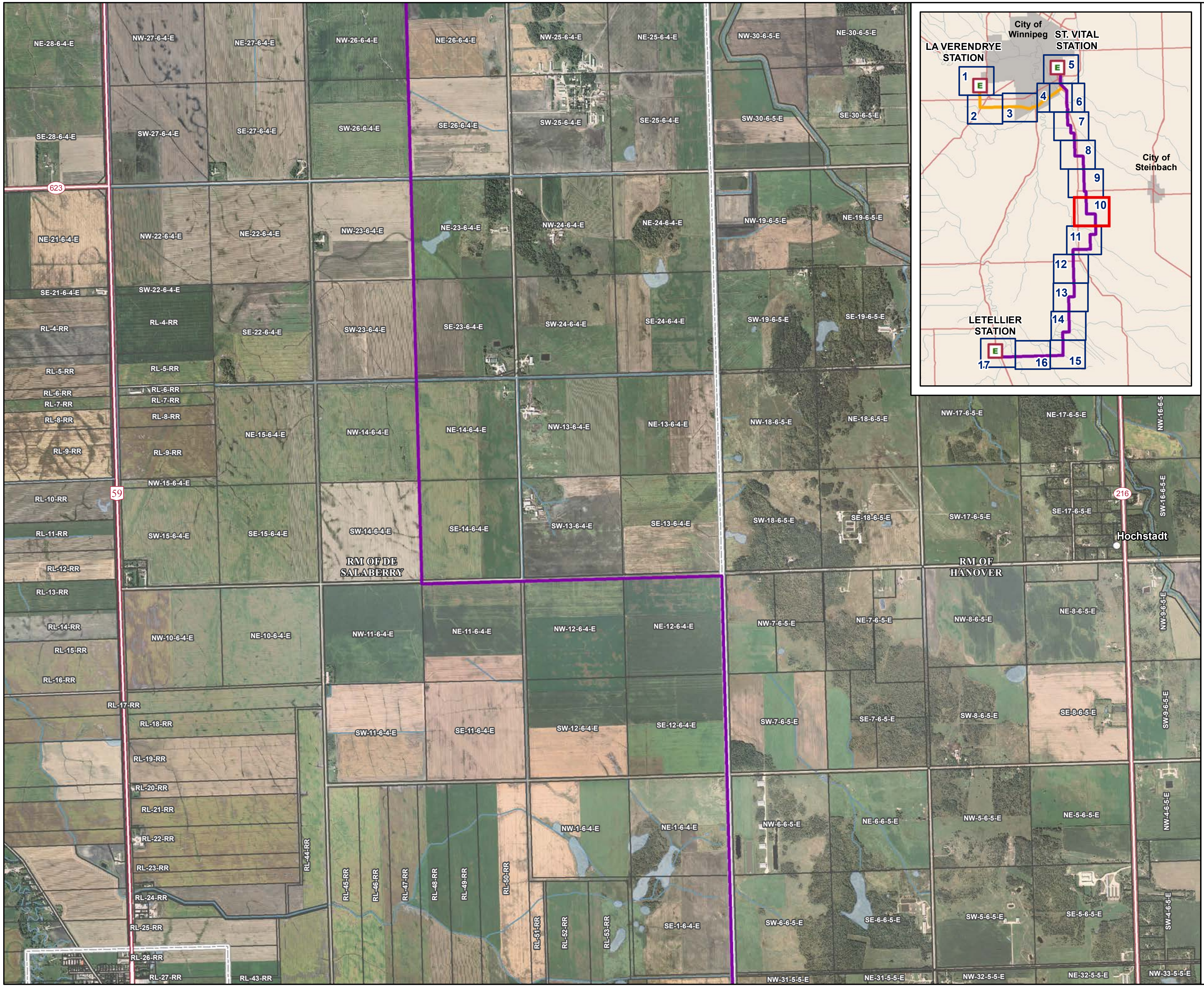
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 13, 2014

N

0 0.5 1 Kilometres
0 0.5 1 Miles 1:30,000

Final Preferred Route
30k Map Folio

Map 12-100 - 9



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- 🟦 Electrical Station
- ━ Final Preferred Route (V95L)
- ━ La Verendrye-St. Vital (Y36V) Transmission Line

Infrastructure

- ┈ Transmission Line

Landbase

- ○ Community
- Trans Canada
- Provincial Highway
- Provincial Road
- ┼ Railway
- ☐ Land Parcel
- ☐ Rural Municipality
- 🟥 First Nation
- 🟩 Provincial Park
- 🟨 Wildlife Management Area
- ─ Watercourse
- 🟦 Waterbody

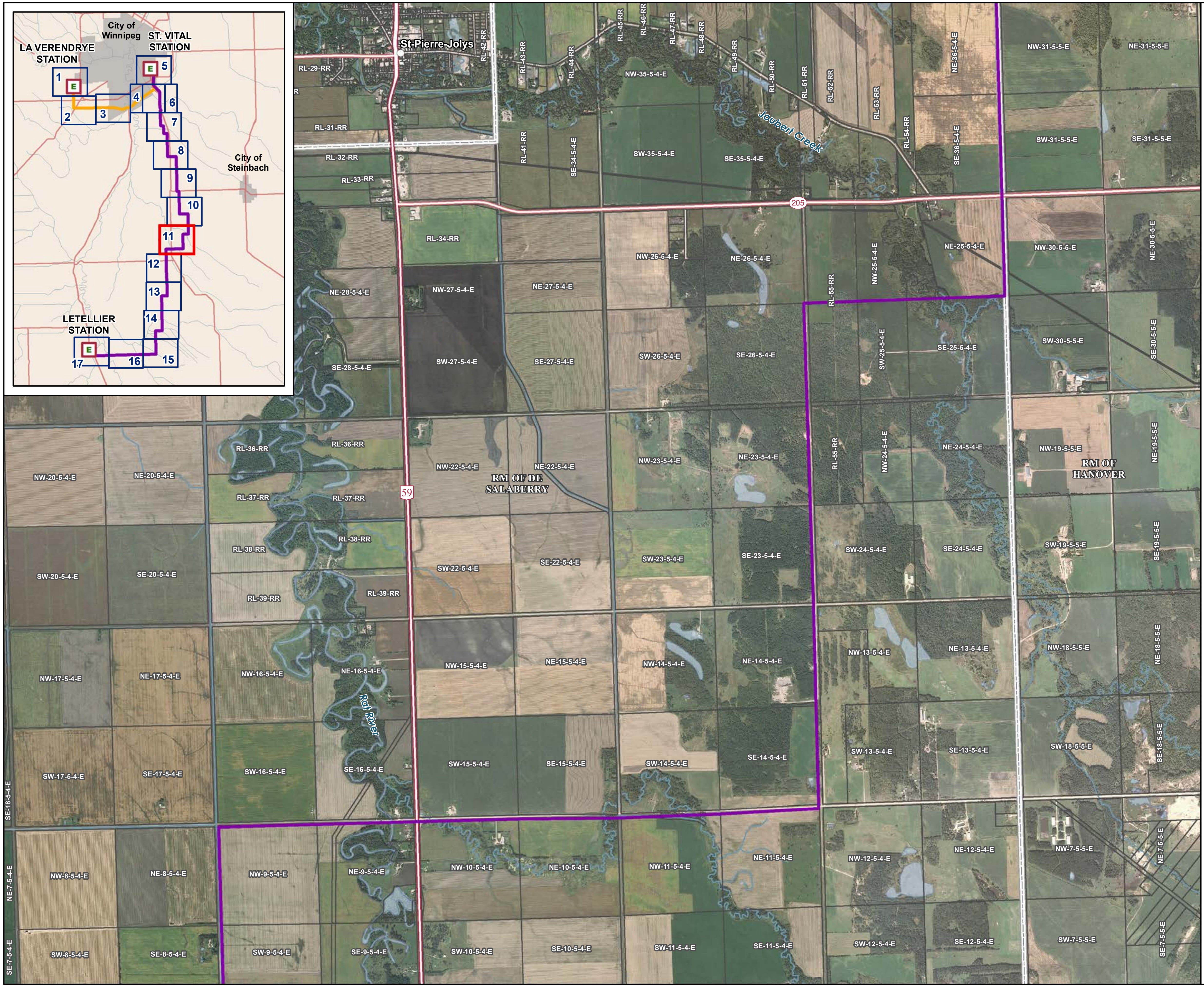
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 13, 2014

N

0 0.5 1 Kilometres
0 0.5 1 Miles 1:30,000

Final Preferred Route
30k Map Folio

Map 12-100 -10



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

🟦 Electrical Station
— Final Preferred Route (V95L)
— La Verendrye-St. Vital (Y36V) Transmission Line

Infrastructure

⋯ Transmission Line

Landbase

○ Community
Trans Canada
Provincial Highway
Provincial Road
Railway
☐ Land Parcel
☐ Rural Municipality
🟥 First Nation
🟩 Provincial Park
🟨 Wildlife Management Area
— Watercourse
🟦 Waterbody

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 13, 2014

N

0 0.5 1 Kilometres
0 0.5 1 Miles 1:30,000

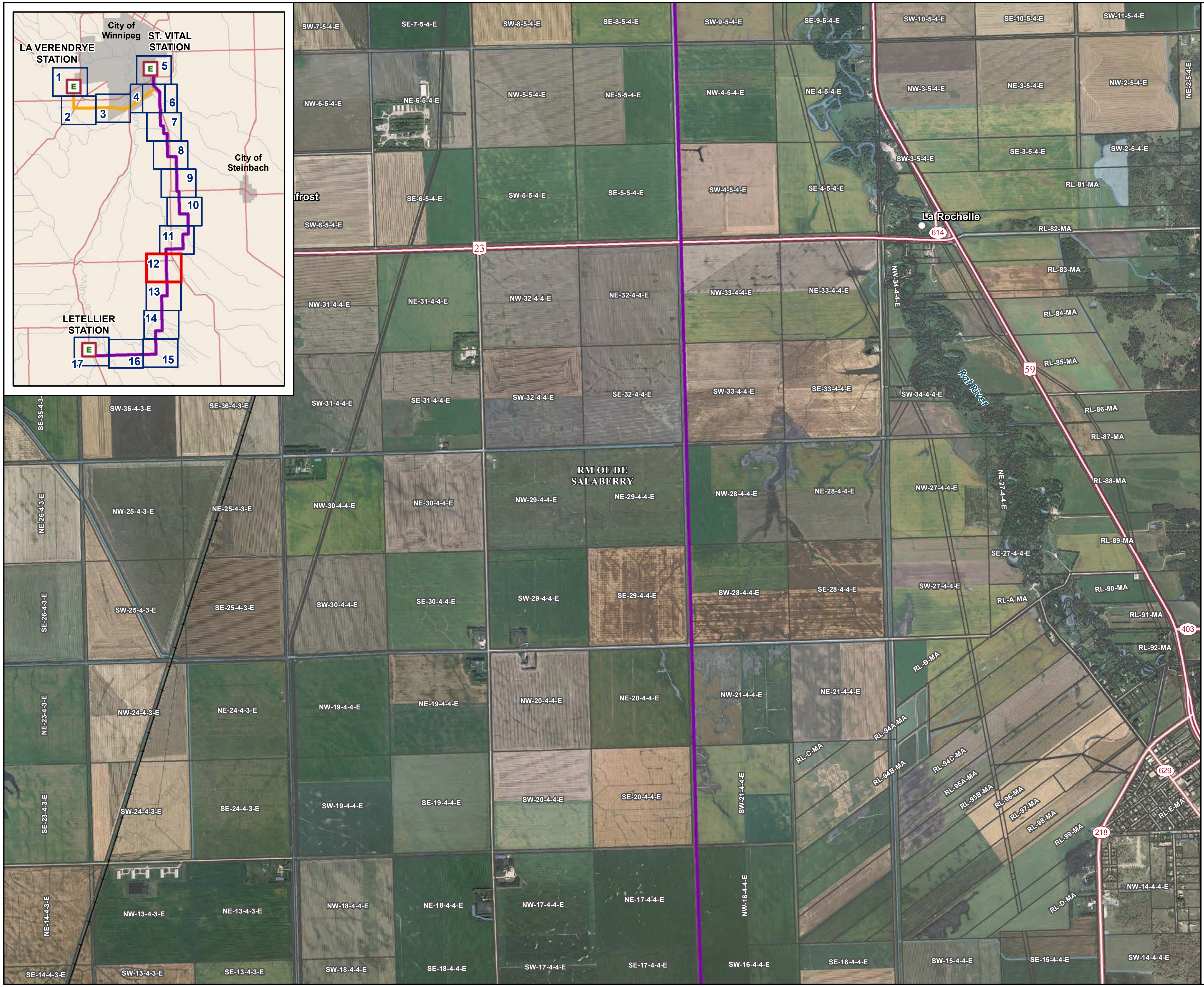
Final Preferred Route

30k Map Folio

Map 12-100 -11

Manitoba Hydro

St. Vital Transmission Complex



Project Infrastructure

- 🟦 Electrical Station
- ━ Final Preferred Route (V95L)
- ━ La Verendrye-St. Vital (Y36V) Transmission Line

Infrastructure

- ┈ Transmission Line

Landbase

- ○ Community
- Trans Canada
- Provincial Highway
- Provincial Road
- ┼ Railway
- ☐ Land Parcel
- ☐ Rural Municipality
- 🟥 First Nation
- 🟩 Provincial Park
- 🟨 Wildlife Management Area
- ─ Watercourse
- 🟦 Waterbody

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 13, 2014

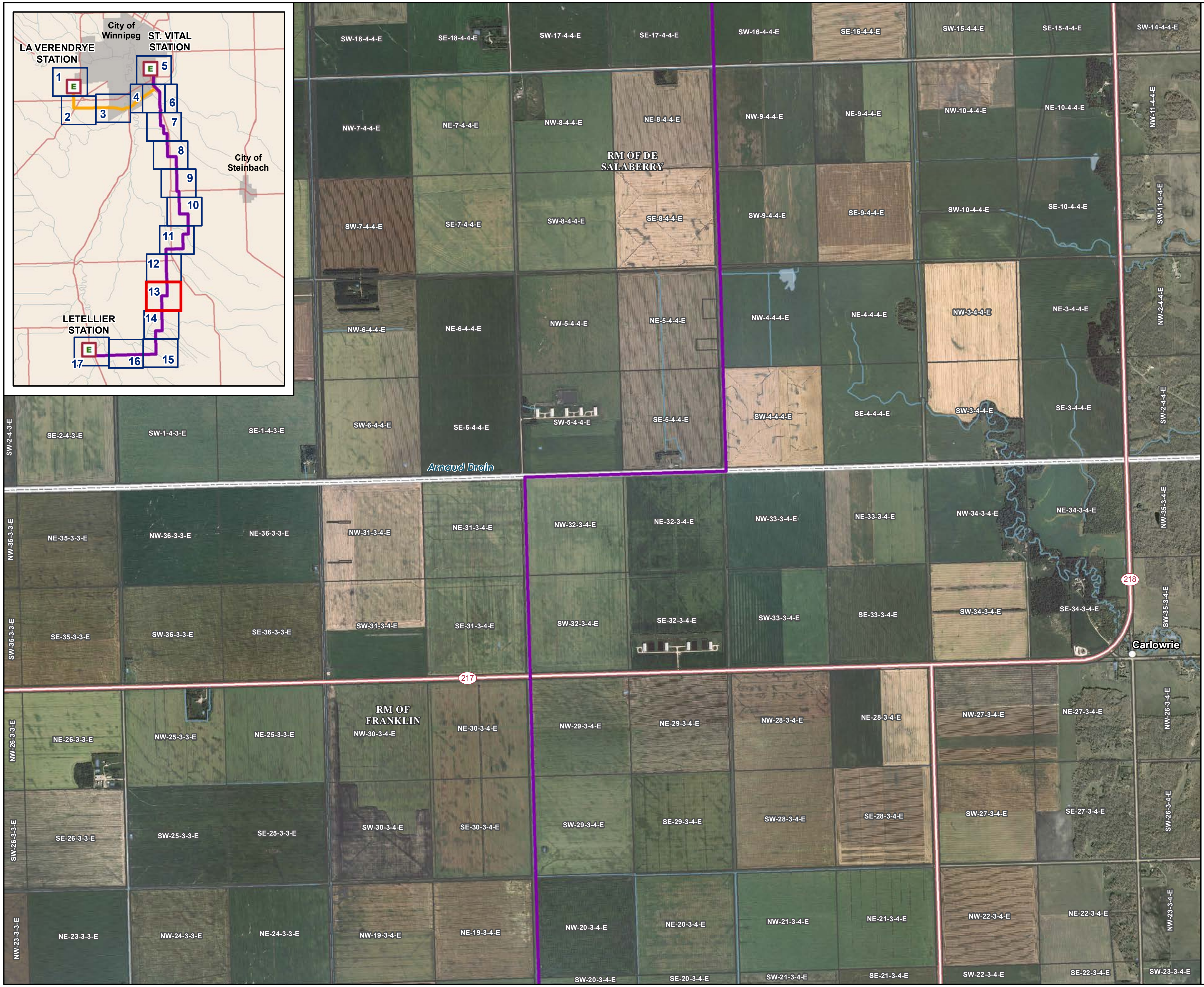
N

0 0.5 1 Kilometres
0 0.5 1 Miles 1:30,000

Final Preferred Route

30k Map Folio

Map 12-100 -12



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

🟦	Electrical Station
—	Final Preferred Route (V95L)
—	La Verendrye-St. Vital (Y36V) Transmission Line

Infrastructure

⋯	Transmission Line

Landbase

○	Community
1	Trans Canada
2	Provincial Highway
100	Provincial Road
┼	Railway
☐	Land Parcel
☐	Rural Municipality
▭	First Nation
▭	Provincial Park
▭	Wildlife Management Area
—	Watercourse
▭	Waterbody

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 13, 2014

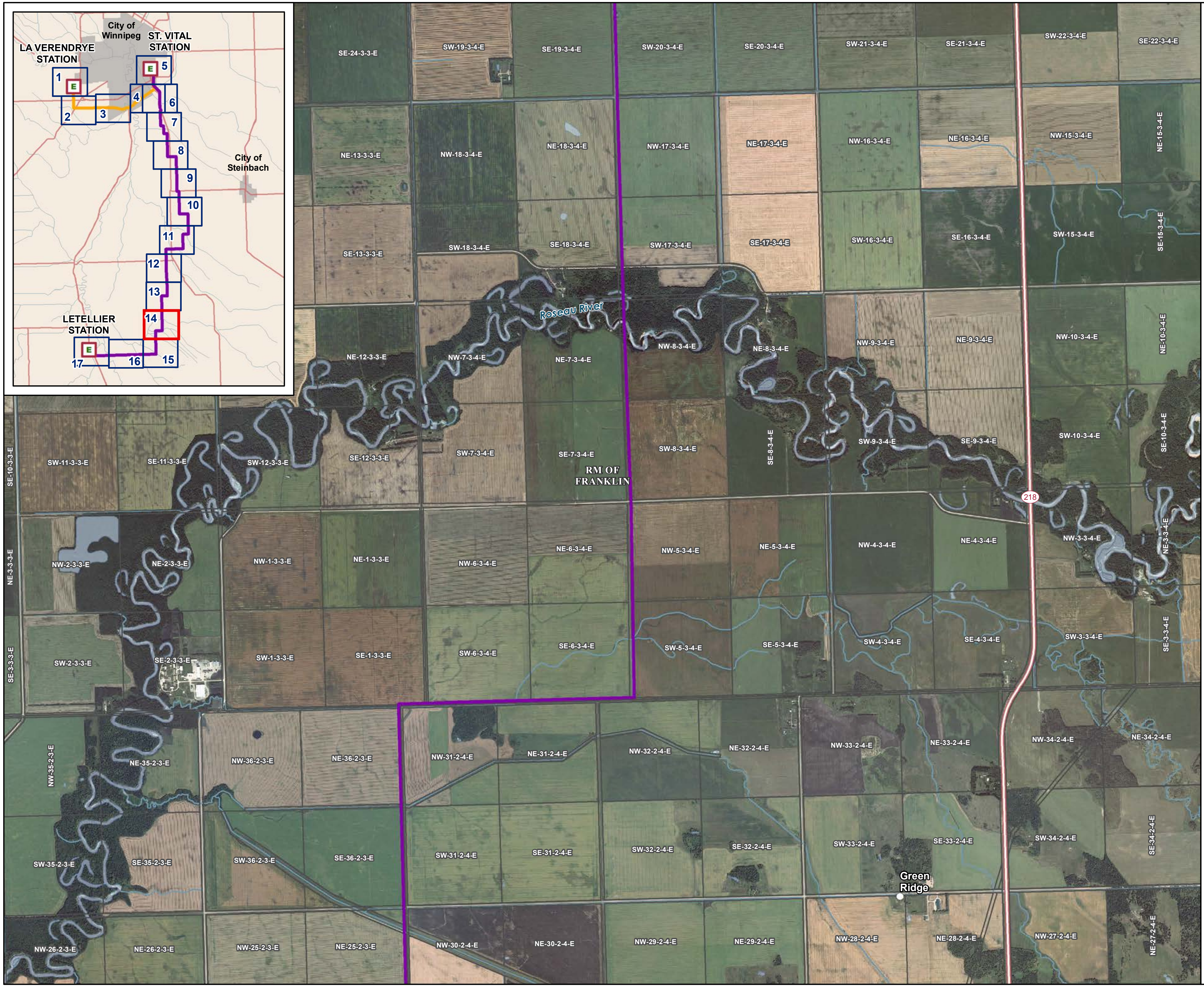
N

0 0.5 1 Kilometres
0 0.5 1 Miles 1:30,000

Final Preferred Route

30k Map Folio

Map 12-100 -13



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

🟦	Electrical Station
—	Final Preferred Route (V95L)
—	La Verendrye-St. Vital (Y36V) Transmission Line

Infrastructure

···	Transmission Line

Landbase

○	Community
	Trans Canada
2	Provincial Highway
100	Provincial Road
┼	Railway
☐	Land Parcel
☐	Rural Municipality
▨	First Nation
▨	Provincial Park
▨	Wildlife Management Area
—	Watercourse
▨	Waterbody

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 13, 2014

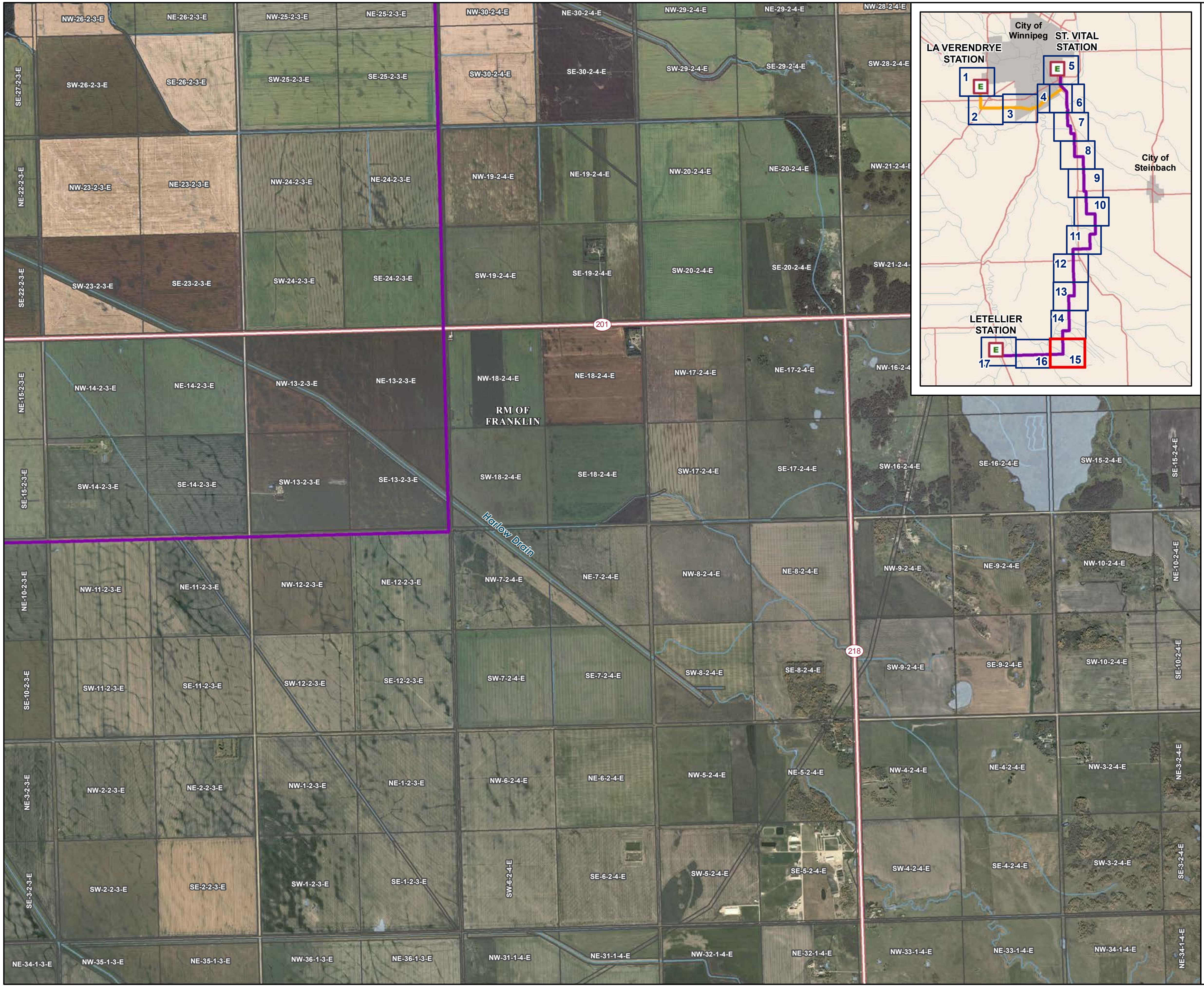
N

0 0.5 1 Kilometres
0 0.5 1 Miles 1:30,000

Final Preferred Route

30k Map Folio

Map 12-100 -14



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

🟦 Electrical Station

— Final Preferred Route (V95L)

— La Verendrye-St. Vital (Y36V) Transmission Line

Infrastructure

Transmission Line

Landbase

○ Community

Trans Canada

Provincial Highway

Provincial Road

Railway

☐ Land Parcel

Rural Municipality

First Nation

Provincial Park

Wildlife Management Area

Watercourse

Waterbody

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 13, 2014

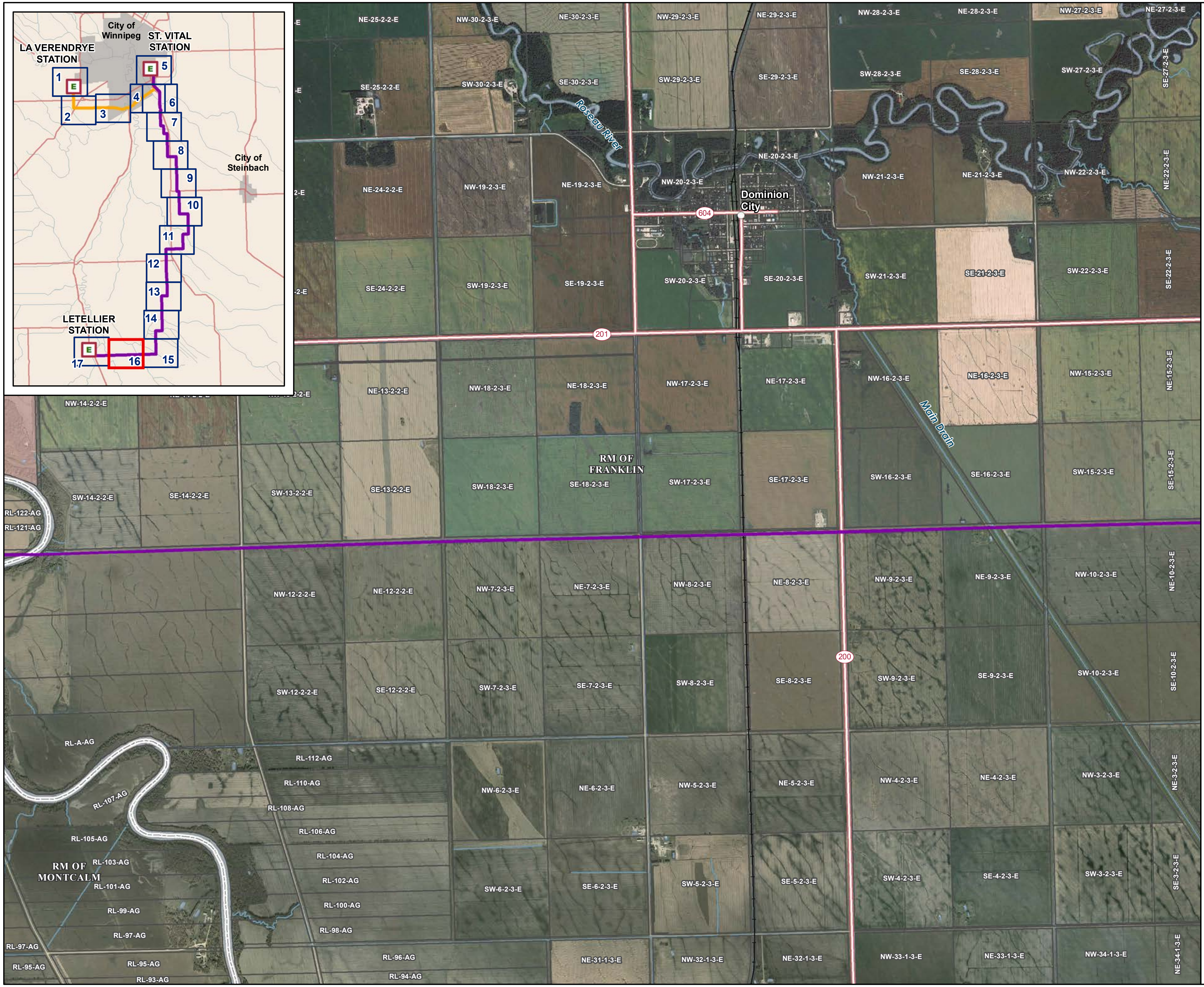
N

0 0.5 1 Kilometres
0 0.5 1 Miles 1:30,000

Final Preferred Route

30k Map Folio

Map 12-100 -15



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

- 🟦 Electrical Station
- Final Preferred Route (V95L)
- La Verendrye-St. Vital (Y36V) Transmission Line

Infrastructure

- Transmission Line

Landbase

- ○ Community
- Trans Canada
- Provincial Highway
- Provincial Road
- Railway
- ☐ Land Parcel
- Rural Municipality
- First Nation
- Provincial Park
- Wildlife Management Area
- Watercourse
- Waterbody

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 13, 2014

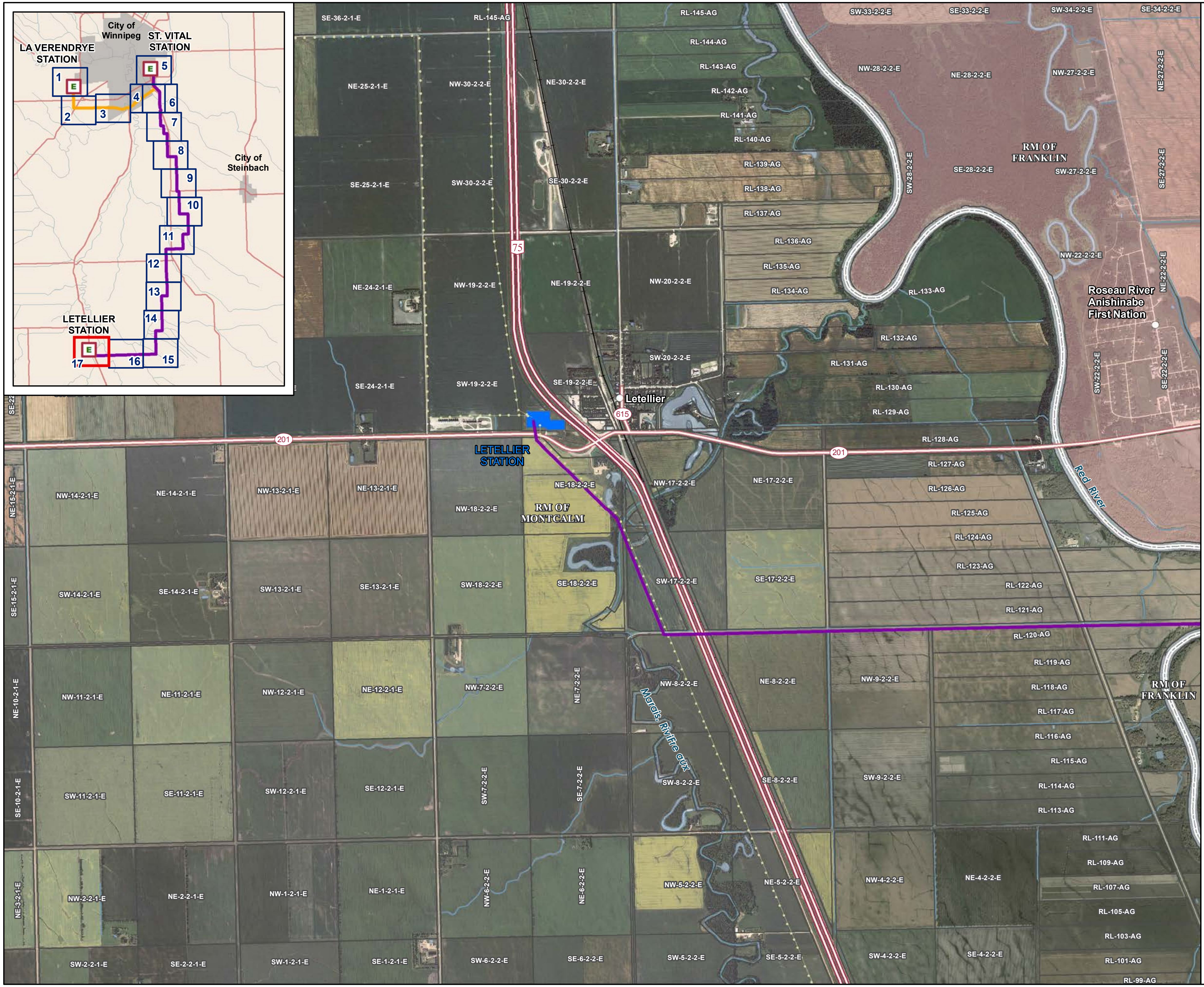
N

0 0.5 1 Kilometres
0 0.5 1 Miles 1:30,000

Final Preferred Route

30k Map Folio

Map 12-100 -16



Manitoba Hydro

St. Vital Transmission Complex

Project Infrastructure

🟦	Electrical Station
━	Final Preferred Route (V95L)
━	La Verendrye-St. Vital (Y36V) Transmission Line

Infrastructure

···	Transmission Line

Landbase

○	Community
1	Trans Canada
2	Provincial Highway
100	Provincial Road
┼	Railway
☐	Land Parcel
▭	Rural Municipality
▭	First Nation
▭	Provincial Park
▭	Wildlife Management Area
─	Watercourse
▭	Waterbody

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: May 13, 2014

N

0 0.5 1 Kilometres
0 0.5 1 Miles 1:30,000

Final Preferred Route

30k Map Folio

Map 12-100 -17

13.0 GLOSSARY

Abundance: This term expresses the number of individuals of a plant species and their coverage in a phytosociological survey; it is based on the coverage of individuals for classes with a coverage higher than 5% and on the abundance for classes with a lower percentage.

Aboriginal Community: A community where most of the residents are Aboriginal (i.e., Indian, Métis or Inuit) and that has a separate form of government, provides some level of service to its residents, and has clear community boundaries.

Aboriginal Peoples: Includes First Nation, Inuit and Métis, as defined in Subsection 35 (2) of the *Constitution Act*, 1982 (Canada).

Access Road: A road that affords access into and out of a ―construction‖ area.

Access Trail: A trail that affords access into and out of a ―construction‖ area.

Access: The ability to enter an area or reach a particular location.

Activity: Activity in relation to a project means actions carried out for construction, operation and eventual decommissioning; and in relation to human presence, actions carried out for domestic and commercial purposes including hunting, fishing, trapping, forestry, mining, etc.

Adaptive Management: The implementation of new or modified mitigation measures over the construction and operation phases of a project to address unanticipated environmental effects. The need for the implementation of adaptive management measures may be determined through an effective follow-up program.

Adverse Effects: Negative effects on the environment and people that may result from a proposed project.

Aerial Spraying: Is a method where aircraft are used for the purpose of spraying pesticides and fertilizers on crops from the air. Often called ‗crop dusting.‗

Aesthetics: Characteristics relating to the appearance or attractiveness of something.

Aggregate: Soil aggregate consisting of two or more soil particles bound together by various forces.

Alignment: The vertical and/or horizontal route or direction of a linear physical feature**.**

Alluvial: Pertaining to materials (e.g., clay, silt, sand, and gravel) deposited by running water, including the sediments laid down in riverbeds, floodplains, lakes and estuaries.

Alternating Current (ac): Is the oscillating (back and forth) flow of electrical current, whereas dc (direct current) is the unidirectional continuous flow of electrical current. AC is the common household electrical current and is used in transmission lines; DC is the form of current produced by battery (e.g., in a flashlight). High Voltage DC (HVdc) transmission is used in

Manitoba for some transmission facilities (e.g., between Limestone Generating Station and Winnipeg).

Alternative means of carrying out a project: The various technically and economically feasible ways, other than the proposed way, for a project to be implemented or carried out. Examples include other project locations, different routes and methods of development, and alternative methods of project implementation or mitigation.

Alternative Routes: Options for routing transmission lines which are identified as part of the Site Selection and Environmental Assessment process.

Alternatives to a project: The functionally different ways, other than a proposed project, to meet the project need and achieve the intended purpose. For example, if a need for greater power generation has been identified, a proposed project might be to build a new power generation facility. An alternative to that project might be to increase the generation capacity of an existing facility.

Aluminum Conductor Steel Reinforced (ASCR): A type of phase conductor used in a three phase ac circuit.

Amphibian: Cold-blooded animal of the Class Amphibia that typically lives on land but breeds in water (e.g., frogs, toads, salamanders).

Angle Tower: A specifically designed structure needed whenever a transmission line changes direction.

Anthropogenic: A descriptive term used to identify different aspects of nature that have been influenced by human activity or activities.

Aquifer: A body of rock or sediment that is sufficiently porous and permeable to store, transmit, and yield significant or economic quantities of groundwater to wells and springs.

Atmosphere: The whole mass of air that surrounds the Earth.

Audible Noise (AN): The measure of noise emanating from a source in an audible frequency. Usually measured in dBA.

Basal Treatment: Refers to the application of herbicide to the lower portion of individual woody plants or stems.

Baseline environment: A description of the environmental conditions at and surrounding a proposed action.

Bedrock: The solid rock that lies beneath the soil and other loose material on the Earth's surface.

Berm: An artificial ridge or embankment used to stop vehicle traffic or to block line of sight.

Biological Control: A method of encouraging competing plant species, planting and maintaining desirable plant species, encouraging wildlife use or encouraging secondary use of the ROW.

Biological diversity (Canada): Means the variability among living organisms from all sources, including, without limiting the generality of the foregoing, terrestrial and marine and other aquatic ecosystems and the ecological complexes of which they form a part and includes the diversity within and between species and of ecosystems.

Biological diversity (Manitoba): Means the variability among all living organisms and the ecological complexes of which they are part, including diversity within and among species and among ecosystems.

Blasting: The act of causing an explosion, consisting of a wave of increased atmospheric pressure followed immediately by a wave of decreased pressure.

Boreal: Pertaining to the north; a climate and ecological zone that occurs south of the subarctic, but north of the temperature hardwood forests of eastern North America, the parkland of the Great Plains region, and the montane forests of the Canadian cordillera.

Boreal Plains Ecozone: An ecological land classification consisting of nearly level to gently rolling plains with wetlands covering between 20 and 50% of the ecozone.

Borrow pits: The hole left by the removal of material (usually sand or gravel) for construction purposes.

Broadleaf: Refers to perennial plants from which the leaves abscise and fall off at the end of the growing season.

Brunisols: Soils of the Brunisolic order have sufficient development to exclude the soils from the Regosolic order, but lack the degrees or kinds of horizon development specified for soils of the other orders. The central concept of the order is that of soils formed under forest and having brownish coloured Bm horizons and/or various colours with both Ae horizons and B horizons having slight accumulations of either clay, or amorphous aluminum and iron compounds, or both.

Buffer Zone: 1) An area that protects or educes impacts to a natural resource from human activity; 2) A strip of land along roads, trails or waterways that is generally maintained to enhance aesthetic values or ecosystem integrity.

Buffer: An area of land separating two distinct land uses that acts to soften or mitigate the effects of one land use on the other.

Built-up Area: An area characterized by residential, commercial and/or industrial development including roads, infrastructure, services, etc.

Burning: The act of setting something on fire.

Calcareous: Composed of, containing or resembling calcium carbonate, calcite or chalk. Calcareous soils containing sufficient calcium carbonate, often with magnesium carbonate, to effervesce visibly when treated with cold 0.1 N hydrochloric acid.

Canadian Standards Association (CSA): Organization that sets standards and criteria for operation of the project.

Canopy: The more or less continuous cover of branches and foliage formed by the crowns of trees.

Carbonate: A rock made up primarily of carbonate minerals (minerals containing the CO3 anionic structure).

Carnivore: An animal species which derives its nutrients from a diet consisting of animal tissue.

Chernozems: Is a soil common to grassland ecosystems. This soil is dark in color (brown to black) and has an A horizon that is rich in organic matter. Chernozems are common in the Canadian prairies.

Circuit (Electric): The complete path of an electric current or a distinct segment of it. In the transmission context, circuit refers to the three conductors that transmit the electricity between station terminals. Transmission lines and structures may carry one or more circuits.

Circuit Breaker: Mechanical switching device capable of making, carrying, and breaking currents under normal circuit conditions and also making, carrying for a specified time, and breaking currents under specified abnormal conditions such as those of a short circuit.

Classification: The systematic grouping and organization of objects, usually in a hierarchical manner.

Cleaning Up: The act of collecting and removing equipment, materials, wastes, etc from a “construction” area.

Clearing: The act of cutting and removing trees from a “construction” area. Trees may be cut by machine or hand methods.

Climate Change: Is a long-term change in the statistical distribution of weather patterns over periods of time that range from decades to centuries. It includes changes in the average weather conditions or a change in the distribution of weather events with respect to an average, such as the amount and frequency of extreme weather events. Climate change is arguably due to both natural causes (i.e. natural processes of the climate system) as well as human-based environmental impacts (ex. increase in concentrations of greenhouse gases) (Natural Resources Canada, 2007).

Committee on the Status of Endangered Wildlife in Canada (COSEWIC): Committee established by the *Species at Risk Act* as the authority for assessing the conservation status of species that may be at risk of extinction in Canada.

Compliance Monitoring: A broad term for a type of monitoring conducted to verify whether a practice or procedure meets the applicable requirements prescribed by legislation, internal policies, accepted industry standards or specific terms and conditions (e.g., in an agreement, lease, permit, licence or authorization).

Conductor: Any material that will readily carry a flow of electricity. In the context of transmission lines, each of the two conductors or conductor bundles comprising a dc circuit, or the three comprising an ac circuit, is referred to as a conductor.

Conservation Data Centre (CDC) Ranking: A Manitoba Conservation status rank assigned to a species by the Conservation Data Centre on the basis of the species‘ province-wide status. Species are assigned a numeric rank ranging from 1 (very rare) to 5 (demonstrably secure).

Conservation: Any of various efforts to preserve or restore the earth’s natural resources, including such measures as: the protection of wildlife, the maintenance of forest or wilderness areas, the control of air and water pollution and the prudent use of farmland, mineral deposits, and energy supplies.

Construction Camp: The temporary housing and support of workers for the purpose of constructing.

Construction: Includes activities anticipated to occur during Project development.

Contaminant: As defined by *The Manitoba Dangerous Goods Handling and Transportation Act*; ―any solid, liquid, gas, waste, radiation or any combination thereof that is foreign to or in excess of the natural constituents of the environment and that effects the natural, physical, chemical or biological quality of the environment; or that is or is likely to be harmful or damaging to the health or safety of a person.‖

Contamination: The act or process of contaminating or changing the level of a contaminant in the natural environment.

Converter Station: The terminal equipment for a high voltage direct current transmission line, in which alternating current is converted to direct current or direct current is converted to alternating current.

Corona Discharge: An electrical discharge around a conductor that can electrically charge air molecules to become air ions.

Corridor: A band of land within which one or more alternative routes can be identified.

Cover: Vegetation such as trees or undergrowth that provides shelter for wildlife. Also, the surface area of a stratum of vegetation as based on the vertical projection on the ground of all above-ground parts of the plant. Also, the material in or over-hanging the wetland area of a lake or stream providing fish with protection from predators or adverse flow conditions, e.g., boulders, deep pools, logs, vegetation.

Critical habitat: An area of habitat or the place in which an organism lives that is essential in providing the requirements needed for a specific species to live.

Cumulative effects assessment: An assessment of the incremental effects of an action on the environment when the environmental effects are combined with those effects from other past, present and future actions.

Cumulative Environmental Effects: The environmental effects that are likely to result from a project in combination with the environmental effects of other past, existing and reasonably foreseeable future projects or activities. For example, one might consider the effects of siltation on fish and fish habitat during construction in combination with the effects of local agriculture and fishing activities.

Current: The rate of motion of electrical charge through a conductor.

Danger Trees: Danger trees are trees located outside a cleared transmission line right-of-way but which may pose a risk of contact or short circuit with the line or structures.

Dangerous Goods: Any product, substance or organism that, by its nature, is able or likely to cause injury, or that is included in any of the classes listed in the *Dangerous Goods Handling and Transportation Regulation* 55/2003 and *Classification Criteria for Products, Substances and Organisms Regulation* 282/87.

Deciduous: Refers to perennial plants from which the leaves abscise and fall off at the end of the growing season (Cauboue et al. 1996).

Decommissioning: Planned shut-down, dismantling and removal of a building, equipment, plant and/or other facilities from operation or usage and may include site clean-up and restoration.

Degradation: The diminution of biological productivity or diversity.

Deleterious Substances: Any substance that, if added to any water, would degrade or alter the quality of that water so that it becomes toxic or harmful to aquatic organisms and habitat.

Demobilizing: The removal of personnel, machinery and materials and other support infrastructure and services from a site after construction is complete.

Development: as defined under *The Environment Act* – Any project, industry, operation or activity, or any alteration or expansion of any project, industry, operation or activity which causes or is likely to cause: a) the emission or discharge of any pollutant to the environment, or b) an effect on any unique, rare or endangered feature of the environment, or c) the creation of by-products, residual or waste products not regulated by *The Dangerous Goods Handling and Transportation Act*, or d) A substantial utilization or alteration of any natural resource in such a way as to pre-empt or interfere with the use or potential use of that resource for any other purpose, or e) A substantial utilization or alteration of any natural resource in such a way as to have an adverse effect on another resource, or f) The utilization of a technology that is concerned with resource utilization and that may induce environmental damage, or g) A significant effect on the environment or will likely lead to a further development which is likely to have a significant effect on the environment, or h) A significant effect on the social, economic, environmental health and cultural conditions that influence the lives of people or a community insofar as they are caused by environmental effects (Manitoba Laws, 2011).

Direct Current (dc): Electrical current that flows in one direction only.

Direct effect: An environmental effect that is a change that a project may cause in the environment; or change that the environment may cause to a project. A direct effect is a consequence of a cause-effect relationship between a project and a specific environmental component.

Disturbance: A disruption in the normal functioning of an organism or system.

Domestic Well: A water well used to supply water for the domestic needs of an individual residence or systems of four or fewer service connections.

Draining: The act of making land drier by providing channels for water to flow away.

Drilling: The act of boring a hole in something (ground or bedrock) with a device such as a drill.

Easement: The permission or right to use a defined area of land for a specific purpose such as transmission line rights-of-way. Transmission line easements give Manitoba Hydro the right of access to the right-of-way to construct, operate and maintain the transmission line.

Ecodistrict: A subdivision of an ecoregion and cartographical delineation of distinct ecological areas, identified by their geology, topography, soils, vegetation, climate conditions, living species, and water resources.

Ecoregion: A geographical area characterized by a distinctive regional climate as expressed by vegetation (Cauboue et al. 1996).

Ecosystem: A functional unit including the living and the non-living things in an area, as well as the relationships between those living and non-living things.

Ecozones: An area of the earth's surface representing large and very generalized ecological units characterized by interacting abiotic and biotic factors; the most general level of the Canadian ecological land classification (Cauboue et al. 1996).

Electric and Magnetic Field (EMF): EMF's are invisible lines of force surrounding any wire carrying electricity, and are produced by all electric tools and appliances, household wiring and power lines. The strengths of EMFs depend on the voltage level and the amount of current flow. Fields fall off sharply with increasing distance from a transmission line; electric fields are easily blocked by vegetation, buildings or other obstacles, while magnetic fields are unaffected by such objects. Electric fields are measured in volts per metre. Magnetic fields are measured in milliGauss.

Electric Current: See current.

Endangered: A species facing imminent extirpation or extinction (COSEWIC, 2010).

Enhance: To improve by increasing in number or quality.

Environment: Biophysical systems, including human, social and economic conditions that are affected by changes in biophysical systems.

Environment (Canada): The components of the Earth and includes: a) Land, water and air, including all layers of the atmosphere, b) All organic and inorganic matter and living organisms, and c) the interacting natural systems that include components referred to in paragraphs a) and b) (Canadian Environmental Assessment Agency 1992).

Environment (Manitoba): Means a) air, land, and water, and b) plant and animal life, including humans.

Environmental Assessment (EA): Process for identifying project and environment interactions, predicting environmental effects, identifying mitigation measures, evaluating significance, reporting and following-up to verify accuracy and effectiveness leading to the production of an Environmental Assessment report. EA is used as a planning tool to help guide decision making, as well as project design and implementation.

Environmental Component: Fundamental element of the physical, biological or socio-economic environment, including the air, water, soil, terrain, vegetation, wildlife, fish, birds and land use that may be affected by a proposed project, and may be individually assessed in the environmental assessment.

Environmental Effect: In respect of a project, a) any change that the project may cause in the environment, including any change it may cause to a listed wildlife species, its critical habitat or the residences of individuals of that species, as those terms are defined in subsection 2(1) of the *Species at Risk Act*, b) any effect of any change referred to in paragraph a) on i) health and socio-economic conditions, ii) physical and cultural heritage, iii) the current use of lands and resources for traditional purposes by aboriginal persons, or iv) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, or any change to the project that may be caused by the environment; whether any such change or effect occurs within or outside Canada (Canadian Environmental Assessment Agency 1992).

Environmental Impact Statement (EIS): A document that presents the findings of an environmental assessment in response to specific guidelines or terms or reference. The term EIS is often used in the context of an assessment by a review panel and in the environmental assessment regimes of other jurisdictions.

Environmental Management System (EMS): Part of an organization‘s overall management practices related to environmental affairs. It includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining an environmental policy. This approach is often formally carried out to meet the requirements of the International Organization for Standardization (ISO) 14000 series.

Environmental Monitoring: Periodic or continuous surveillance or testing, according to a pre-determined schedule, of one or more environmental components. Monitoring is usually conducted to determine the level of compliance with stated requirements, or to observe the status and trends of a particular environmental component over time.

Environmental Protection Plan (EnvPP): Within the framework of an Environmental Protection Program, an Environmental Protection Plan prescribes measures and practices to avoid and minimize potential environmental effects of a proposed project. A user-friendly guide for the contractor and Manitoba Hydro that includes: information such as a brief project description; updated construction schedule; summary identifying environmental sensitivities and mitigation actions; listing of all federal, provincial or municipal approvals, licences, or permits that are required for the project; a description of general corporate practices and specific mitigating actions for the various construction and maintenance activities; emergency response plans, training and information; and environmental/engineering monitoring plans and reporting protocols.

Environmental Protection Program (EPP): Provides a framework for delivery, management and monitoring of environmental protection activities in keeping with issues identified in the environmental assessment, regulatory requirements and public expectation.

Environmentally Sensitive Site: Locations, features, areas, activities or facilities along or immediately adjacent to the transmission line right of way and other project components that are determined to be ecologically, socially, economically or culturally important and sensitive to disturbance by the Project and, as a result, require site-specific mitigation measures. The sites may include sensitive or unique terrain features, waterbodies and wetlands, important mammal, bird, and amphibian habitats, protected species and areas, and heritage resources.

Erosion: Process by which the Earth's surface is worn away by the actions of water and wind.

Evaluation: The determination of the significance of effects. This involves making judgements as to the value of what is being affected and the risk that the effect will occur and be unacceptable.

Extirpated: The extinction of a species within a given area, with the species still occurring within the remainder of their range.

Feller Bunchers: A type of harvester used in logging. A motorized vehicle with an attachment that can rapidly cut and gather several trees before felling them.

Fen: A type of wetland fed by surface and/or groundwater; water chemistry is neutral to alkaline and sedges are the dominant vegetation.

Fill: Natural soils that are manually or mechanically placed; soil or loose rock used to raise a grade.

Fish: “Fish” includes:

(a) parts of fish,

(b) shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and

(c) the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals (Fisheries Act, 1985).

Fish Habitat: Spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes (*Fisheries Act,* 1985).

Flowing Well: A well that has a static water level above the adjacent ground surface and occurs when water pressure in an aquifer causes the water level to rise above the ground surface.

Follow-up Program: A program for: a) verifying the accuracy of the environmental assessment of a project, and b) determining the effectiveness of any measures taken to mitigate the adverse environmental effects of the project.

Footprint: The surface area occupied by a structure or activity.

Forb: A broad-leaved, non-woody plant that dies back to the ground after each growing season.

Forest: A relatively large assemblage of tree-dominated stands.

Foundation: The surface or subsurface base that is in direct contact with the ground and supports a structure.

Fragmentation: The breaking up of contiguous blocks of habitat into increasingly smaller blocks as a result of direct loss and/or sensory disturbance. Eventually, remaining blocks may be too small to provide usable or effective habitat for a species.

Freshet: The occurrence of water flow from a sudden rain fall or snow melt.

Freshwater Quality Index:

Perennial: Streams or rivers that have continuous flow in parts of their stream bed year-round during years of normal rainfall. During unusually dry years, a normally perennial stream may cease flowing, becoming intermittent for days, weeks, or months depending on severity of the drought.

Intermittent: Streams which normally cease flowing for weeks or months each year.

Ephemeral: Channels that flow only for hours or days following rainfall.

Furbearing Species: Referring to those mammal species that are trapped (e.g., marten, fox, etc.) for the useful or economic value of their fur.

Game Hunting Area (GHA): Designated areas in Manitoba in which game hunting is regulated by species, quota, means, etc.

Glaciofluvial: Descriptive of material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and may occur in the form of outwash plains, deltas, kames eskers, and kame terraces.

Glaciolacustrine: Pertaining to, derived from, or deposited in glacial lakes; especially said of the deposits and landforms composed of suspended material brought by melt water streams flowing into lakes bordering the glacier, such as deltas, kame deltas, and varved sediments.

Gleysols: An order of soils developed under wet conditions and permanent or periodic reduction. They occur under a wide range of climatic conditions; Gleysolic soils may or may not have a thin Ah horizon over mottled gray or brownish gleyed material. They may have up to 40 cm of mixed peat or 60 cm of fibric moss peat on the surface.

Grading: The act of levelling or sloping the ground evenly by mechanical means (i.e., grader).

Granular: In the context of construction materials, refers to materials composed of granules or grains of sand or gravel.

Grassland: Vegetation consisting primarily of grass species occurring on sites that are arid or at least well drained.

Greenhouse Gases (GHGs): Gases e.g., methane, carbon dioxide, chlorofluorocarbons emitted from a variety of sources and processes that contribute to global warming by trapping heat between the Earth and the upper atmosphere.

Gross Domestic Product (GDP): The total monetary value of all goods and services produced domestically by a country.

Ground Electrode: In the context of HVdc bipoles, the ground electrodes provide a ground or earth return system both for minor imbalances of current between the positive and negative poles during normal operation and, in the event of a pole outage, for current from the operating pole (i.e., monopolar operation). Shallow ring electrodes are anticipated to be used for Bipole III. These typically are a large metal ring about 300-800 metres in diameter buried approximately three metres in the ground and surrounded by a highly conductive bed of coke.

Groundwater: Water that occurs beneath the land surface and fills the pore spaces of soil or rock below saturated zone.

Groundwater Recharge: The natural or intentional infiltration of surface water into the zone of saturation.

Groundwater Table: The upper surface of the zone of saturation in an unconfined aquifer.

Grubbing: The act of removing roots from soil using a root rake, harrow or similar device.

Guideline: Non-mandatory, supplemental information about acceptable methods, procedures and standards for implementation of requirements found in legislation, policies and directives.

Guyes or Guy Wires: Supporting wires that are used to stabilize some transmission line structures.

Habitat: The place in which an animal or plant lives; the sum of environmental circumstances in the place inhabited by an organism, population or community. Habitat for a particular species is identified with a species prefix (e.g., fish habitat, jack pine habitat, wolf habitat).

Hazardous Substance: Any substance which, by reason of being explosive, flammable, poisonous, corrosive, oxidizing or otherwise harmful, is likely to cause death or injury

Hazardous Waste: As defined by Manitoba Regulation 175/87: a product, substance or organism that is a source of danger and that meets the criteria set out in the Classification Criteria products, Substances and Organism Regulation, Manitoba Regulation 282/87, and that is intended for treatment or disposal, including recyclable material.

Hectares (ha): A metric unit of square measure equal to 10,000 square metres or 2.471 acres.

Herb (Herbaceous): A plant without woody above-ground parts, the stems dying back to the ground each year.

Herbaceous plants: A non-woody vascular plant.

Herbicide: A product used to destroy or inhibit plant growth.

Herbivore: An animal species adapted to eating plant material for the main component of its diet.

Heritage Resource: A heritage site, heritage object and any work or assembly of works of nature or of human endeavour that is of value for its archaeological, palaeontological, pre-historic, historic, cultural, natural, scientific or aesthetic features, and may be in the form of sites or objects or a combination thereof (*The Heritage Resources Act*).

High Voltage Direct Current (HVdc) Transmission System: A high voltage electric power transmission system that uses direct current for the bulk transmission of electrical power. Direct Current flows constantly in only one direction (frequency of change or oscillation is 0 Hertz [Hz]).

High Water Mark (Ordinary): The visible high water mark of any lake, stream, or other body of water where the presence and action of the water are so common and usual and so long continued in all ordinary years as to mark upon the soil of the bed of the lake, river stream, or other body of water a character distinct from that of the banks, both in vegetation and in the nature of the soil itself. Typical features may include, a natural line or "mark" impressed on the bank or shore, indicated by erosion, shelving, changes in soil characteristics, destruction of terrestrial vegetation, or other distinctive physical characteristics.

Horizons: A specific layer in the soil which parallels the land surface and possesses physical or chemical characteristics which differ from the layers above and beneath.

Hydraulic Conductivity: A measure of the capacity for a rock or soil to transmit water; generally has the units of feet/day or cm/sec.

Hydrocarbon: An organic compound that contains only carbon and hydrogen; derived mostly from crude petroleum and also from coal tar and plant sources (diesel fuel, fuel oil, gasoline and lubricating oils are complex mixtures of hydrocarbons); excessive levels may be toxic.

Hydrology: The science dealing with the properties, distribution and circulation of water.

Impact: General term referring to the overall effect of a project. Accepted use includes Environmental Impact Statement, Economic Impact and Cumulative Impact.

Incorporated Communities: Communities that form part of a municipality, city, town or village with its own government.

Indicator Species: species, groups of species or species habitat elements that focus management attention on resource production, population recovery, population viability or ecosystem diversity; these species often have narrower habitat requirements that can be used to indicate the relative suitability of habitat for other species that share a similar preference.

Indicators: Anything that is used to measure the condition of something of interest. Indicators are often used as variables in the modeling of changes in complex environmental systems. In an environmental assessment, indicators are used to predict changes in the environment and to evaluate their significance.

Indirect Effect: A secondary environmental effect that occurs as a result of a change that a project may cause in the environment. An indirect effect is at least one step removed from a project activity in terms of cause-effect linkages. For instance, a river diversion for the construction of a hydro power plant could directly result in the destruction of fish habitat causing a decline in fish population. A decline in fish population could result in closure of an outfitting operation causing loss of jobs. Thus, the river diversion could indirectly cause the loss of jobs.

Infrastructure: The basic features needed for the operation or construction of a system (e.g. access road, construction camp, construction power, batch plant, etc.).

Invertebrates: Animals without a spinal column.

Invasive: Invasive species are plants that are growing outside of their country or region of origin and are out-competing or even replacing native plants.

Kilometre (km): The unit measure of length equivalent to 1000 metres; one kilometre = 0.62 miles.

Kilovolt (kV): The unit of electromotive force or electrical pressure equivalent to 1,000 volts (V).

Lacustrine: Referring to freshwater lakes; sediments generally consisting of stratified fine sand, silt, and clay deposits on a lake bed.

Lichen: Is a complex group of plants depending on a close association (symbiotic relationship) between a fungus and algae.

Linear feature: A geographic feature, such as a trail or road, which can be represented by a line.

Load: The power requirement (usually measured in kilowatts) of an electrical system or piece of electrical equipment at a given instant.

Loamy: Loam soil is rich, friable (crumbly) soil with nearly equal parts of sand and silt, and somewhat less clay. The term is sometimes used imprecisely to mean earth or soil in general. Loam in subsoil receives varied minerals and amounts of clay by leaching (percolation) from the topsoil above.

Long-Term Effect: Effect which persists long after restoration or mitigation activities have been carried out.

Luvisols: Soils of the Luvisolic order generally have light-coloured, eluvial horizons and have illuvial B horizons in which silicate clay has been accumulated. These soils develop characteristically in well to imperfectly drained sites, in sandy loam to clay base saturated parent material under forest vegetation in subhumid to humid, mild to very cold climates. Mineral soils where clay particles from the upper layer have been transported to the layer below to the extent that a Bt horizon has developed.

Manitoba Agriculture, Food and Rural Initiatives (MAFRI): Manitoba provincial department focussing on agriculture activities.

Marsh: Tract of low wetland, often treeless and periodically inundated, generally characterized by a growth of grasses, sedges, cattails and rushes.

Marshalling Yard: An open area used to stock-pile, store and assemble construction materials.

Megawatt (MW): The unit of electrical power equivalent to 1,000,000 watts.

Metre (m): A unit measure of length; one metre = 3.28 ft.

Mile (mi.): A unit of length equal to 5,289 feet. 1 mile equals 1.6 kilometres.

Mitigation: In respect of a project, the elimination, reduction or control of the adverse environmental effects of the project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means (Department of Justice, 2011a).

Mitigation measures: Changes in the temporal or spatial aspects of the Project or the means in which the Project will be constructed, operated or decommissioned in order to minimize environmental effects. Mitigation measures are applied in addition to Project design aspects that include mitigation as standard practices.

Mixedwood: Forest stands composed of conifers and angiosperms each representing between 25 and 75% of the cover.

Monitoring: Continuing assessment of conditions at and surrounding an activity. This determines if effects occur as predicted or if operations remain within acceptable limits and if mitigation measures are as effective as predicted.

North American Reliability Electric Corporation (NERC): Develops and enforces reliability standards; assesses adequacy annually via a 10-year forecast, and summer and winter forecasts; monitors the bulk power system; and educates, trains and certifies industry personnel (NERC 2011).

Omnivore: An animal species that can derive nutrients from a variety of food sources such as plants, animals, algae and fungi.

Open Trapping Area: Areas in the southern portion of Manitoba which is open for harvesting of furbearers by licensed trappers, on lands which they have the right to access, such as private land and most provincial wildlife management areas.

Organic: Of, relating to, or derived from living matter. Also refers to an order of soils that have developed dominantly from organic deposits.

Paleozoic: A geologic era that is marked by the culmination of all classes of invertebrates except insects and the appearance of seed-bearing plants, amphibians and reptiles.

Parameters: Any set of physical, chemical or biological properties, the values of which determine the characteristics or behaviour of a system.

Passerine: Birds from the order Passeriformes; generally songbirds and perching birds. For the purposes of assessment, passerines are birds that do not belong to the other VEC groups outlined.

Perennial: Plants that have a lifecycle of 2 or more years.

Permeability: The degree to which fluids or gases can pass through a barrier or material such as soil. The capability of soil or other geologic formations to transmit water. See hydraulic conductivity.

Physical Work: Anything that has been or will be constructed (human-made) and has a fixed location. Examples include a bridge, building or pipeline. Natural water bodies, airplanes and ships at sea are not physical works.

Policy: Basic principles and corresponding procedures and standards by which an organization is guided.

Potable Water: Water suitable for human and animal consumption.

Pre-construction: Includes all project activities (surveying, staking, mapping) that lead up to but do not include project construction, including all field studies (aquatic, plant, wildlife) and related public liaison activities.

Prediction Confidence: Quantifying or estimating the environmental effect, considering the quality or quantity of data and the understanding of the effect mechanisms. It is the known or estimated effectiveness of the proposed mitigation measures.

Preferred Route: The best balanced choice of route based on public input, biophysical, socio-economic, and cost and technical considerations. Preferred routes are generally identified during a Site Selection and Environmental Assessment process.

Premature Mortality Rates (PMR): PMR is an indicator of the rate of early death (i.e., death before average life expectancy) in a population and is highly associated with morbidity and self-rated health, as well as with socio-economic risk factors for poor health. In Manitoba, premature mortality rates are calculated as the number of deaths that occur before age 75 per 1,000 residents.

Project (Canada): Means: a) In relation to a physical work, any proposed construction, operation, modification, decommissioning, abandonment or other undertaking in relation to that physical work, or b) Any proposed physical activity not relating to a physical work that is prescribed or is within a class of physical activities that is prescribed pursuant to regulations made under paragraph 59(b) (Canadian Environmental Assessment Agency 1992).

Project Activity: Elements of a project component that may result in environmental effects or changes. Example project activities include clearing, grubbing, excavating, stockpiling, reclaiming, etc.

Project Component: A component of the project that may have an effect on the environment. Example project components include access road, construction camp, wastewater treatment facility, etc.

Project Description: Any information in relation to a project that includes, at least: (a) a summary description of the project; (b) information indicating the location of the project and the areas potentially affected by the project; (c) to the extent possible, a summary description of the physical and biological environments within the areas potentially affected by the project; and (d) the mailing address, e-mail address and phone number of a contact person who can provide additional information about the project (*Canadian Environmental Assessment Act,* Federal Coordination Regulations).

Project Footprint: The land and/or water surface area affected by a project. This includes direct physical coverage and direct effects. Consequently, an project footprint may be larger than its physical dimensions if off-site activities are involved.

Proponent: A person who is undertaking, or proposes to undertake a development or who has been designated by a person or group of persons to undertake a development in Manitoba on behalf of that person or group of persons.

Protected Area: As defined by the World Conservation Union, a protected area is: an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.

Protected Species: Plant and animal species protected under the *Species at Risk Act* (Federal) or *The Endangered Species Act* (Manitoba).

Provincial Road (PR): Secondary route of travel in Manitoba. PRs are numbered from 200-632. It is not uncommon for these routes to be gravel.

Provincial Trunk Highway (PTH): Primary route of travel in Manitoba. PTHs are numbered from 1-200.

Qualitative Analysis: Analysis that is subjective.

Quantitative Analysis: Analysis that uses environmental variables represented by numbers or ranges and is often accompanied by numerical modeling or statistical analysis.

Quarry: An open excavation or pit from which stone, gravel or sand is obtained by digging, cutting or blasting.

Radio Interference (RI): Any modification to the reception of sound or picture signals that makes them unacceptable.

Raptor: A predatory bird species with the physical traits adapted for grasping prey, sharp talons, and tearing flesh, hooked beak. The group of birds termed raptors includes the owls, falcons, eagles and hawks.

Rare Species: Any indigenous species of flora that, because of its biological characteristics, or because it occurs at the fringe of its range, or for some other reasons, exists in low numbers or in very restricted areas of Canada but is not a threatened species (Cauboue et al. 1996).

Recycling: Diversion of materials from the waste stream for reprocessing into new products (e.g., newspapers).

Region: Any area in which it is suspected or known that effects due to the action under review may interact with effects from other actions. This area typically extends beyond the local study area.

Regional Study Area (RSA): a study area used to characterize the existing environment within the vicinity of the Project.

Regosols: Regosolic soils do not have an Ah or dark-colored Ap horizon at least 10 cm thick at the mineral soil surface. They may have buried mineral-organic layers and organic surface horizons, but no B horizon at least 5 cm thick.

Regulatory: Pertaining to legislated requirements (i.e., statues, laws, regulations).

Rehabilitation: To restore a disturbed structure, site or land area to good condition, useful operation or productive capacity.

Reliability: Describes the ability of a system or component to function under stated conditions for a specified period of time.

Remediate: To return to the state prior to alternation; to remedy.

Reptiles: Cold-blooded animals of the Class Reptilia that includes tortoises, turtles, snakes, lizards, alligators and crocodiles.

Residual Environmental Effect: An environmental effect that remains, or is predicted to remain, even after mitigation measures have been applied.

Resource Management Area (RMA): An area to be jointly managed by a Resource Management Board established by agreement between Manitoba and a First Nation or a local Aboriginal community.

Restoration: The return of an ecosystem or habitat to its original community structure, natural complement of species and natural function.

Reuse: Subsequent use without significant treatment of a material remaining after being used in a previous process.

Re-vegetating: Adding vegetative cover by planting, seeding or other means on a disturbed site.

Right-of-Way (ROW): Area of strip of land controlled and maintained for the development of a road, or transmission [or distribution] line (including construction, operation, and maintenance of the facility).

Riparian: Refers to terrain, vegetation or simply a position adjacent to or associated with a stream, flood plain, or standing body of water.

Risk: A state of uncertainty where some of the possibilities involve a loss, catastrophe or other undesirable outcome. Quantitatively, risk is proportional to both the expected losses which may be caused by an event and to the probability of this event. The greater loss and greater event likelihood result in a greater overall risk.

Root Collar: Position on a plant where there is a junction with where the roots begin to grow and the stem begins.

Salinity: Generally, the concentration of mineral salts dissolved in water. When describing salinity influenced by seawater, salinity often refers to the concentration of chlorides in the water. See also total dissolved solids.

Salvageable timber: Timber that is of sufficient size (stem diameter and length) to be useable for commercial or non-commercial purposes, exclusive of economic and logistical considerations.

Scoping: An activity that focuses the environmental assessment of a proposal on relevant issues and concerns, types of effects, alternatives for consideration, timeframe, methodology, and establishes the boundaries of the assessment.

Sediment: Material, including soil and organic material that is deposited by wind, water and glaciers.

Selective Clearing: Removal of specific or selected trees and vegetation, rather than all vegetation (e.g., at sensitive sites).

Self-Supporting Suspension Lattice: A steel structure supported on four separately founded legs.

Setback: Prescribed distance between a pollution sources or disturbance and a resource or ecosystem that needs protection.

Shoreline: The narrow strip of land in immediate contact with the sea, lake or river.

Shorebird: Any bird that frequents the shoreline between the ocean or large lakes and the land, particularly a bird of the suborder Charadii, such as sandpipers, plovers or snipe.

Short-Term Effect: When the recovery of the affected population and area is expected to occur within one generation.

Shrub: A perennial plant usually with a woody stem, shorter than a tree, often with a multi-stemmed base.

Significance: A conclusion about whether adverse environmental effects are likely to be significant, taking into account the implementation of appropriate mitigation measures. Significance is determined by a combination of scientific data, regulated thresholds, standards, social values and professional judgment.

Site: The area or exact plot of ground on which anything is, has been, or is to be located.

Site Selection and Environmental Assessment (SSEA): Site Selection and Environmental Assessment process used to select a site or route for a transmission facility (i.e, a station or a transmission line) and assess any potential environmental impacts of that facility on the biophysical environment and socio-economic conditions.

Spatial Boundary: The area examined in the assessment (i.e., the study area).

Spawning Habitat: Areas suitable for the deposition of eggs and the incubation of the eggs.

Species of Special Concern: A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events (COSEWIC, 2010).

Species: A group of organisms having a common ancestry that are able to reproduce only among themselves; a general definition that does not account for hybridization.

Species at Risk Act (SARA): The federal Act which provides for the legal protection for wildlife species listed under "Schedule 1" of that Act.

Species at Risk: Means an extirpated, endangered or threatened species or a species of special concern.

Species of Conservation Concern: Includes species that are rare, disjunct, or at risk throughout their range or in Manitoba and in need of further research. The term also encompasses species that are listed under the *Manitoba Endangered Species Act* (MBESA), or that have a special designation by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC and MBCDC 2014).

Splicing: Connecting two or pieces of linear material, like cable, together.

Staging (area): An area where birds congregate to rest and occasionally feed, generally during spring and fall migration (Wildlife Resources Consulting Services 2011).

Stand: A collection of plants having a relatively uniform composition and structure, and age in the case of forests (Cauboue et al. 1996).

Standards: Descriptions of targets or goals used to measure the success of procedures. They may be general or specific.

Stripping: The act of removing the natural soil and organic covering from an area by mechanical means.

Study Area: The geographic limits within which environmental effects are assessed.

Substation: An assemblage of equipment for switching and/or transforming or regulating the voltage of electricity.

Substrate: The medium on which plants grow.

Suckering: The growth of a plant that produces new shoots at the base or below ground traveling out from the plant base.

Sustainability: Capacity of a thing, action, activity or process to be maintained indefinitely in a manner consistent with Manitoba's Principles and Guidelines of Sustainable Development.

Sustainable Development (SD) (Manitoba): Meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Temporal: Pertaining to time.

Terrestrial: Pertaining to land as opposed to water (Cauboue et al. 1996).

The Manitoba Endangered Species Act (MESA): Enacted: 1) to ensure the protection and survival of endangered and threatened species in the province; 2) to enable the reintroduction of extirpated species into the province; and 3) to designate species as endangered, threatened, extinct or extirpated. Additions or deletions to list of species under each designation are recommended by the Endangered Species Advisory Committee.

Threatened: A species likely to become endangered if limiting factors are not reversed (COSEWIC 2010).

Till: An unstratified, unconsolidated mass of boulders, pebbles, sand and mud deposited by the movement or melting of a glacier.

Timber: The wood of growing trees suitable for structural uses; the body, stem or trunk of a tree.

Topography: The surface features of a region, such as its hills, valleys or rivers.

Towers: The transmission line structures which provide support for the conductors to ensure clearance from the ground. Towers are may be either free standing or guyed and are typically a steel lattice design.

Traditional Activities: Hunting, trapping, fishing and food gathering by Aboriginal peoples whether for subsistence purposes or not.

Transformer Station: A transmission station which includes power transformer, to convert power to the appropriate voltage for delivery to regional subtransmission or distribution facilities, or to the higher voltage required for economical and efficient transmission over longer distances to a load centre.

Transformer: An electrical device, commonly located in substations, used to transform (convert) power from one voltage level to another.

Transmission Line: A linear arrangement of towers and conductors which carries electricity from generating stations and transmission stations to load centres like communities and industries to meet electrical needs**.**

Transmission System: The towers, conductors, substations, and related equipment involved with transporting electricity from generation source to areas for distribution—or to the power systems of out-of-province electrical utilities.

Transmission: A process of transporting electric energy in bulk from a source of supply to other parts of the electrical system (e.g., load centres like large communities of major industrial customers).

Treaty Land Entitlement (TLE): Refers to land owed to certain First Nations under the terms of the Treaties signed by the First Nations and Canada between 1871 and 1910. Each Treaty provided that Canada would provide reserve land to First Nations based on population size; however, not all First Nations received their full allocation of land. In 1997, the Manitoba Treaty

Land Entitlement Agreement was signed by the TLE Committee of Manitoba Inc. (representing 20 First Nations), Canada and Manitoba.

Tributary: Any secondary stream or river that flows into a larger waterbody.

Trophic: (trophic level): A functional classification of species that is based on feeding relationships (e.g. generally aquatic and terrestrial green plants comprise the first trophic level, and herbivores comprise the second).

Type A fish habitat: Watercourse that provides direct complex fish habitat with indicator species present, i.e. potential for presence of Commercial, Sport, Aboriginal and SARA listed fish species.

Type B fish habitat: Watercourse that provides direct simple fish habitat with indicator species present, i.e. potential for presence of Commercial, Sport, Aboriginal and SARA listed fish species.

Type C fish habitat: Watercourse that provides direct complex fish habitat without indicator species, i.e. potential for presence of forage fish species.

Type D fish habitat: Watercourse that provides direct simple fish habitat without indicator species, i.e. potential for presence of forage fish species.

Type E fish habitat: Watercourse that does not provide direct fish habitat.

Uncertainty: The lack of certainty or a state of having limited knowledge where it is impossible to exactly describe existing state or future outcome, more than one possible outcome. In environmental assessment not knowing the nature and magnitude of environmental effects or the degree to which mitigation measures would prevent or reduce adverse effects.

Understory: That portion of the trees or other vegetation in a forest stand that is below the main canopy level.

Ungulates: Any of a number of mammals with hooves that are superficially similar but not necessarily closely related taxonomically.

Valued Component (VC): Any part of the environment that is considered important by the proponent, public, scientists, and government involved in the assessment process; importance may be determined on the basis of societal or cultural values, or scientific interest or concern (Manitoba Hydro 2011b).

Vascular Plant: A plant having a specialized system of channels for carrying fluids (water and dissolved materials).

Vegetation: The general cover of plants growing on a landscape.

Velocity: A measurement of the speed of flow.

Vertisolic: An order of soils that occur in heavy-textured materials (>60% clay, of which at least half is smectite) and have a shrink-swell character. They lack the degree of horizon development diagnostic of soils of the other soil orders, and the surface (Ah) horizon, when dry, has a massive structure and is hard. It consists of the Vertisol and Humic Vertisol great groups.

Volt: Electric pressure which causes current to flow.

Vulnerability: Refers to the degree to which a system is susceptible to, and unable to cope with, the adverse effects of climate change. The IPCC further defines vulnerability as a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity (Natural Resources Canada 2007).

Waterbird: A bird commonly associated with water, e.g., waterfowl, terns and gulls.

Waterbody: Any location where water flows or is present, whether or not the flow or the presence of water is continuous, intermittent, or occurs only during a flood. This includes, but is not limited to, wetlands and aquifers.

Waterfowl: Ducks and geese (game birds that frequent water).

Watershed: The region draining into a river, river system or other body of water.

Water Quality: Description of the chemical, physical, and biological characteristics of water, usually in regard to its suitability for a particular purpose or use.

Wetland: Land that is saturated with water long enough to promote hydric soils or aquatic processes as indicated by poorly drained soils, hydrophytic vegetation, and various kinds of biological activity that are adapted to wet environments.

Wildlife: Free-ranging animals which live in the wild, natural or undomesticated state.

Work Camp: A temporary place to house workers when a construction site is far from their place of residence.

14.0 LIST OF ACRONYMS AND ABBREVIATIONS

ac	Alternating Current
ACSR	Aluminum Conductor Steel Reinforced
A.D.	Anno Domini
AN	Audible Noise
ASI	Area of Special Interest
AADT	Average Annual Daily Traffic
CAR	Census Agricultural Area
CCME	Canadian Council of Ministers of the Environment
CD	Conservation District
CEAA	Canadian Environmental Assessment Act or Agency
CEPA	*Canadian Environmental Protection Act*
cfs	Cubic Feet per Second
CHRS	Canadian Heritage Rivers System
cm	Centimetre
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CSA	Canadian Standards Association
dB	Decibel
dc	Direct Current
DFO	Department of Fisheries and Oceans
DO	Dissolved Oxygen
EA	Environmental Assessment
EAL	Environment Act Licence
EAPF	Environment Act Proposal Form
EIS	Environmental Impact Statement
EMF	Electric and Magnetic Field
EMS	Environmental Management System
EnvPP	Environmental Protection Plan

EPP	Environmental Protection Program
EPRI-GTC	Electrical Power Research Institute – Georgia Transmission Corporation
ERP	Emergency Response Plan
ESS	Environmentally Sensitive Sites
FIHCS	Fisheries Inventory and Habitat Classification System
FPR	Final Preferred Route
FQI	Freshwater Quality Index
GDP	Gross Domestic Product
GHA	Game Hunting Area
GHG	Greenhouse Gas
GIS	Geographical Information System
GPS	Global Positioning System
ha	Hectare
HVdc	High Voltage Direct Current
ICNIRP	International Commission on Non-Ionizing Radiation Protection
INAC	Indian and Northern Affairs Canada
IWMP	Integrated Watershed Management Planning
KI	Key Indicator
km	Kilometre
KPI	Key Person Interview
kV	Kilovolt
LAA	Local Assessment Area
LCC	Canadian Land Cover Classification
LIC	Landowner Information Centre
LUD	Local Urban District
m	Metre
MASC	Manitoba Agricultural Crop Service
MAFRI	Manitoba Agriculture, Food and Rural Initiatives
MBCA	Migratory Bird Convention Act

MBCDC	Manitoba Conservation Data Centre
MCDC	Manitoba Conservation Data Centre
MCWS	Manitoba Conservation and Water Stewardship
MESA	*Manitoba Endangered Species Act*
mG	Milligauss
MIT	Manitoba Infrastructure and Transportation
MMF	Manitoba Métis Federation
MMTP	Manitoba Minnesota Transmission Project
MRPD	Macdonald-Ritchot Planning District
MWQSOG	Manitoba Water Quality Standards, Objectives and Guidelines
MWS	Manitoba Water Stewardship
NCC	Nature Conservancy of Canada
NERC	North American Electric Reliability Corporation
NGO	Non-governmental organization
OPGW	Optical Protection Ground Wire
PAI	Protected Areas Initiative
PDA	Project Development Area
PEP	Public Engagement Process
PFRA	Prairie Farm Rehabilitation Administration
PMA	Premature Mortality Rates
PR	Provincial Road
PSSA	Project Siting Study Area
PTH	Provincial Trunk Highway
PUP	Pesticide Use Permit
RAA	Regional Assessment Area
RHA	Regional Health Authority
RM	Rural Municipality
ROW	Right-of-Way
RSA	Regional Study Area

RTAC	Regional Transportation Advisory Committee
SARA	*Species at Risk Act*
SOCC	Species of Conservation Concern
SSEA	Site Selection and Environmental Assessment
SVTC	St. Vital Transmission Complex
TAC	Technical Advisory Committee
TCPL	TransCanada Pipeline
TSS	Total Suspended Solids
RCMP	Royal Canadian Mounted Police
RRAFN	Roseau River Anishinabe First Nation
VC	Valued Component
VEC	Valued Environmental Component
WMA	Wildlife Management Area

15.0 LIST OF UNITS

acre	ac
centimetre	cm
decibel	dB
degrees Celcius	°C
degrees (lat/long)	°
feet	ft
greater than	>
hectare	ha
kilovolt	kV
kilometres	km
square kilometre	km^2
less than	<
megawatt	MW
metre	m
millimetre	mm
percent	%

APPENDIX A

HERITAGE ENVIRONMENT TECHNICAL MEMORANDUM

APPENDIX B

AQUATIC ENVIRONMENT TECHNICAL MEMORANDUM

APPENDIX C

TERRESTRIAL ENVIRONMENT TECHNICAL MEMORANDUM

APPENDIX D

PUBLIC ENGAGEMENT PROCESS TECHNICAL MEMORANDUM

(SEE CD ON BACK COVER)